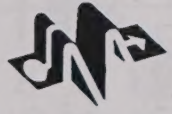
SCHEMATIC DIAGRAMS AND CALIBRATION PROCEDURE

MODEL 2190

100 MHz

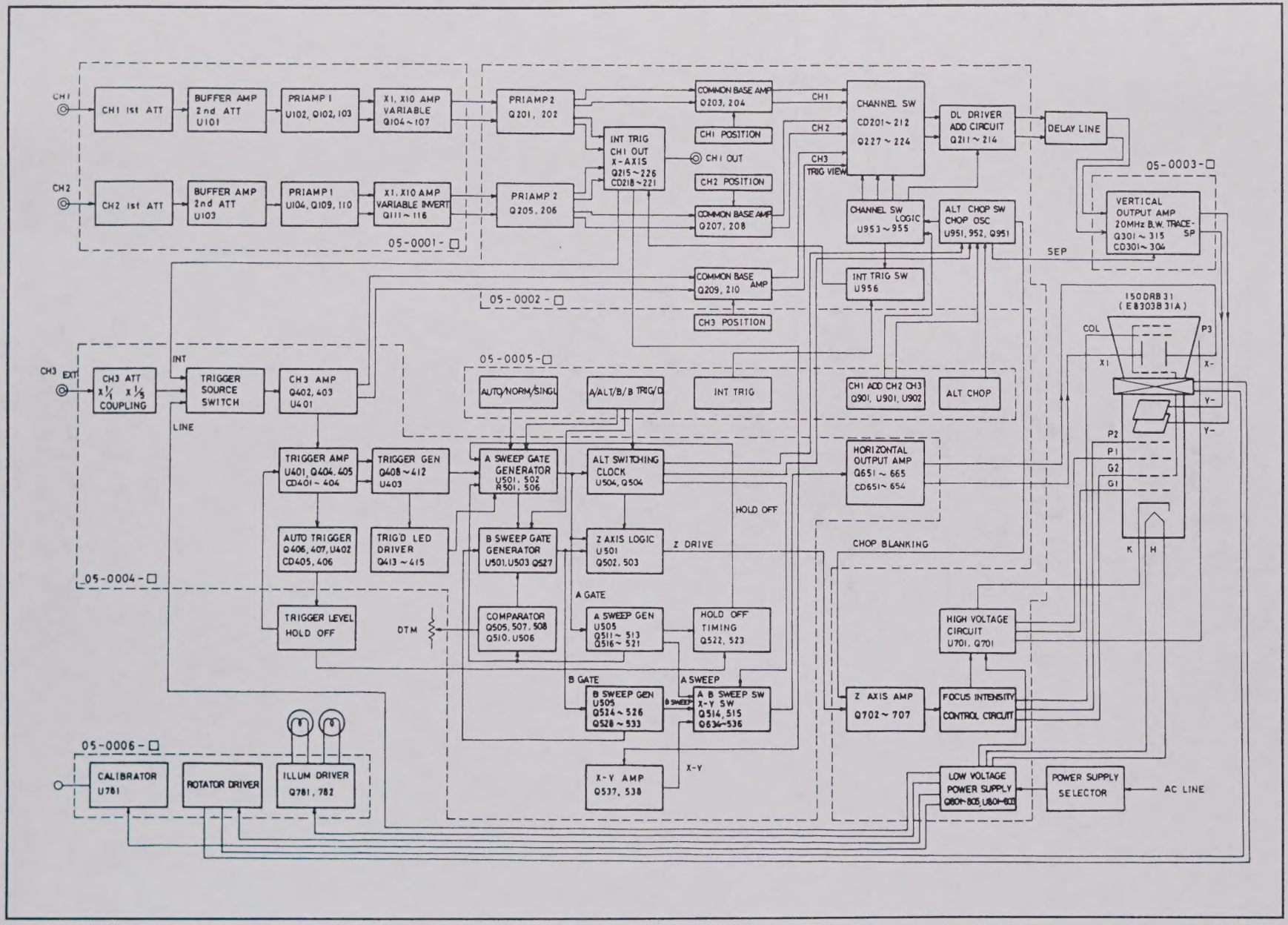
Three Channel

OSCILLOSCOPE

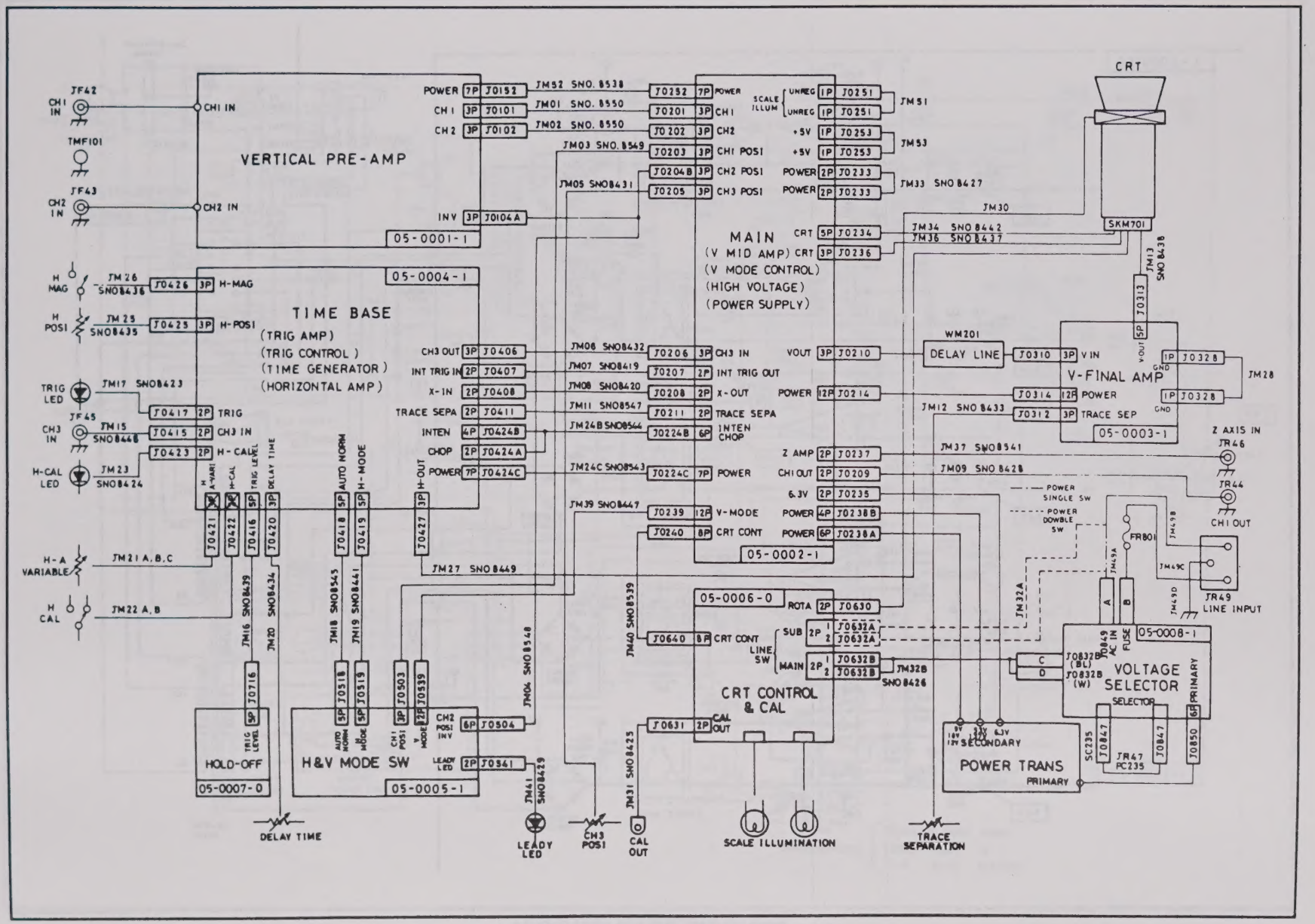


B+K PRECISION®

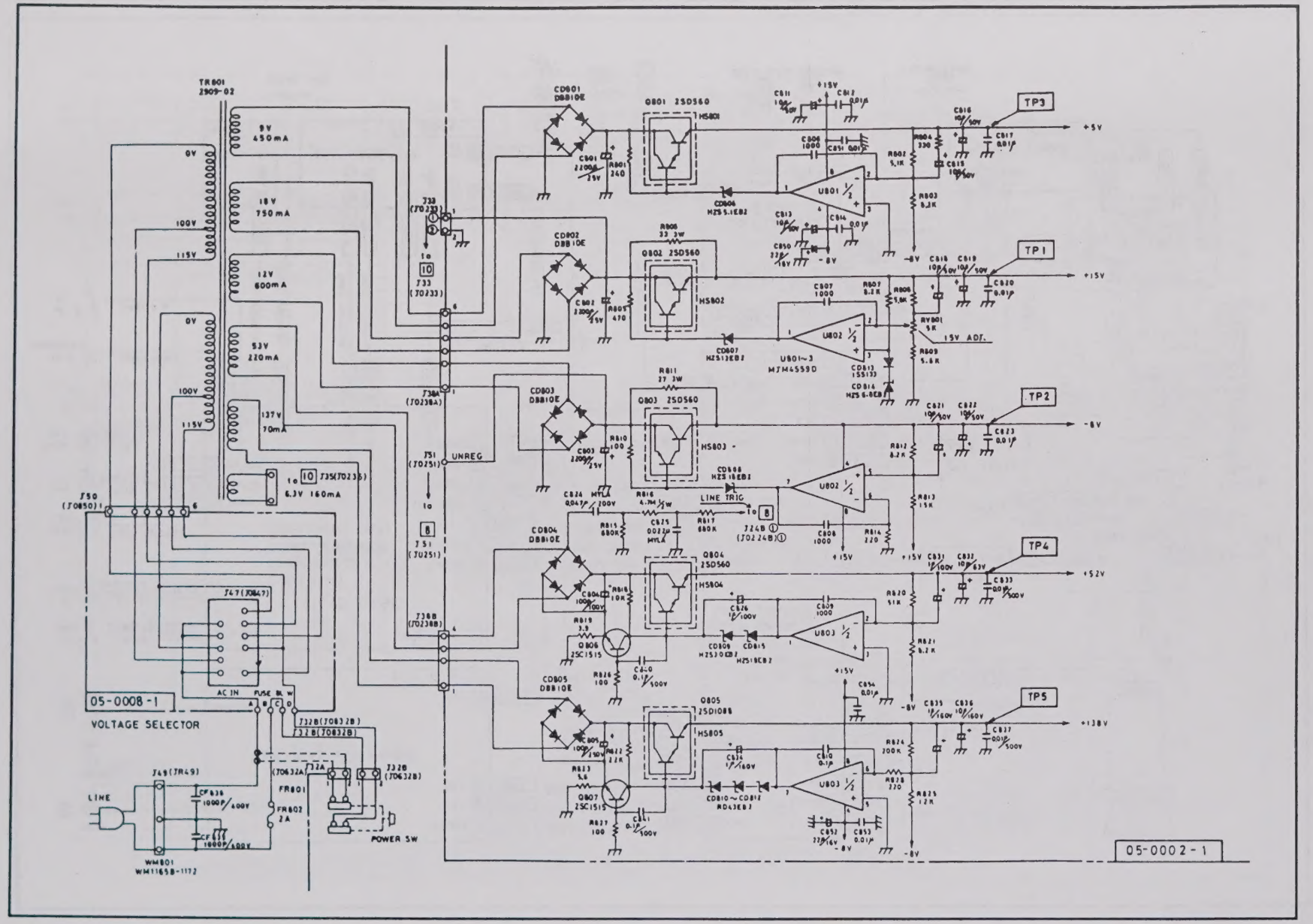
499-412-9-001



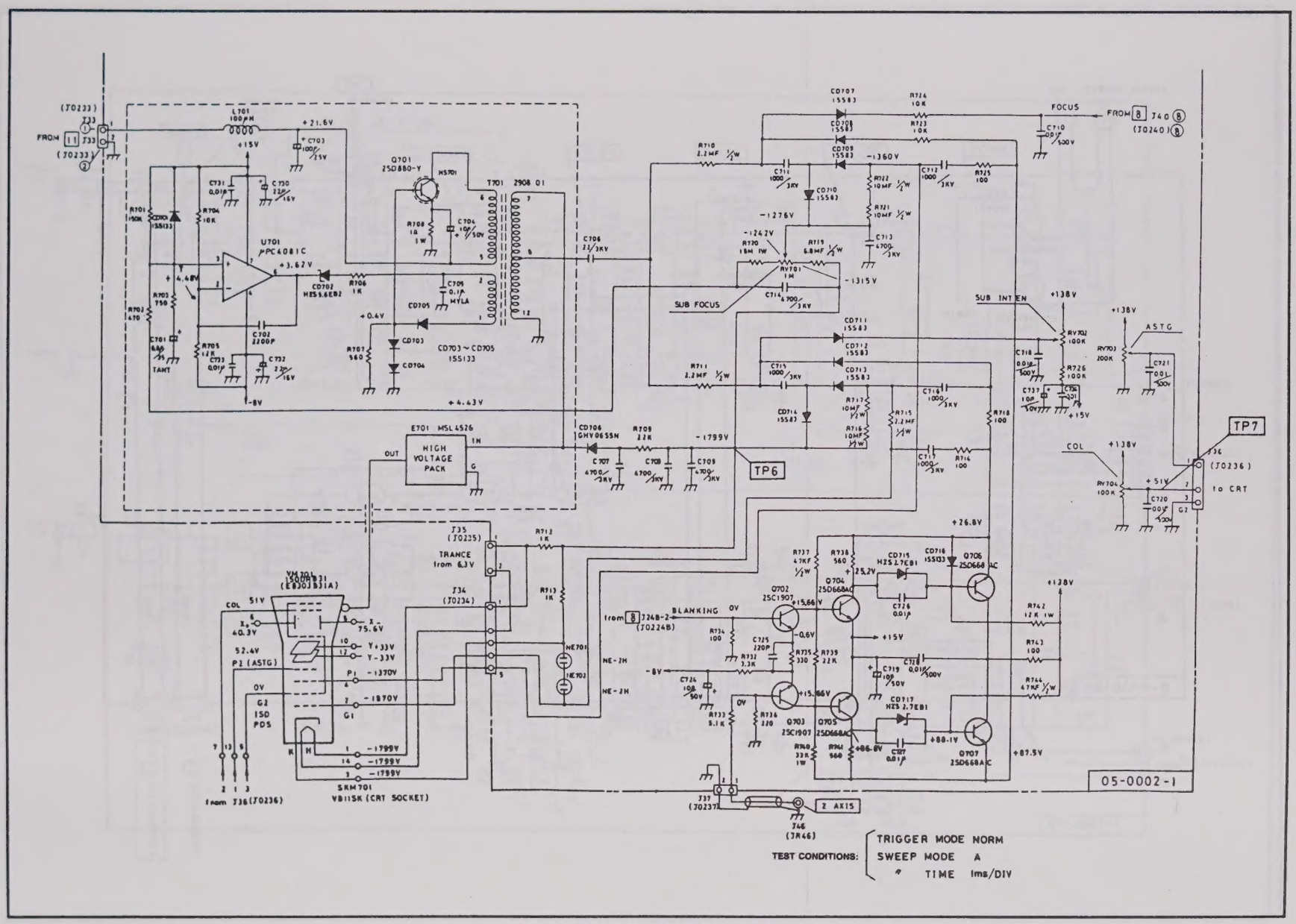
BLOCK DIAGRAM



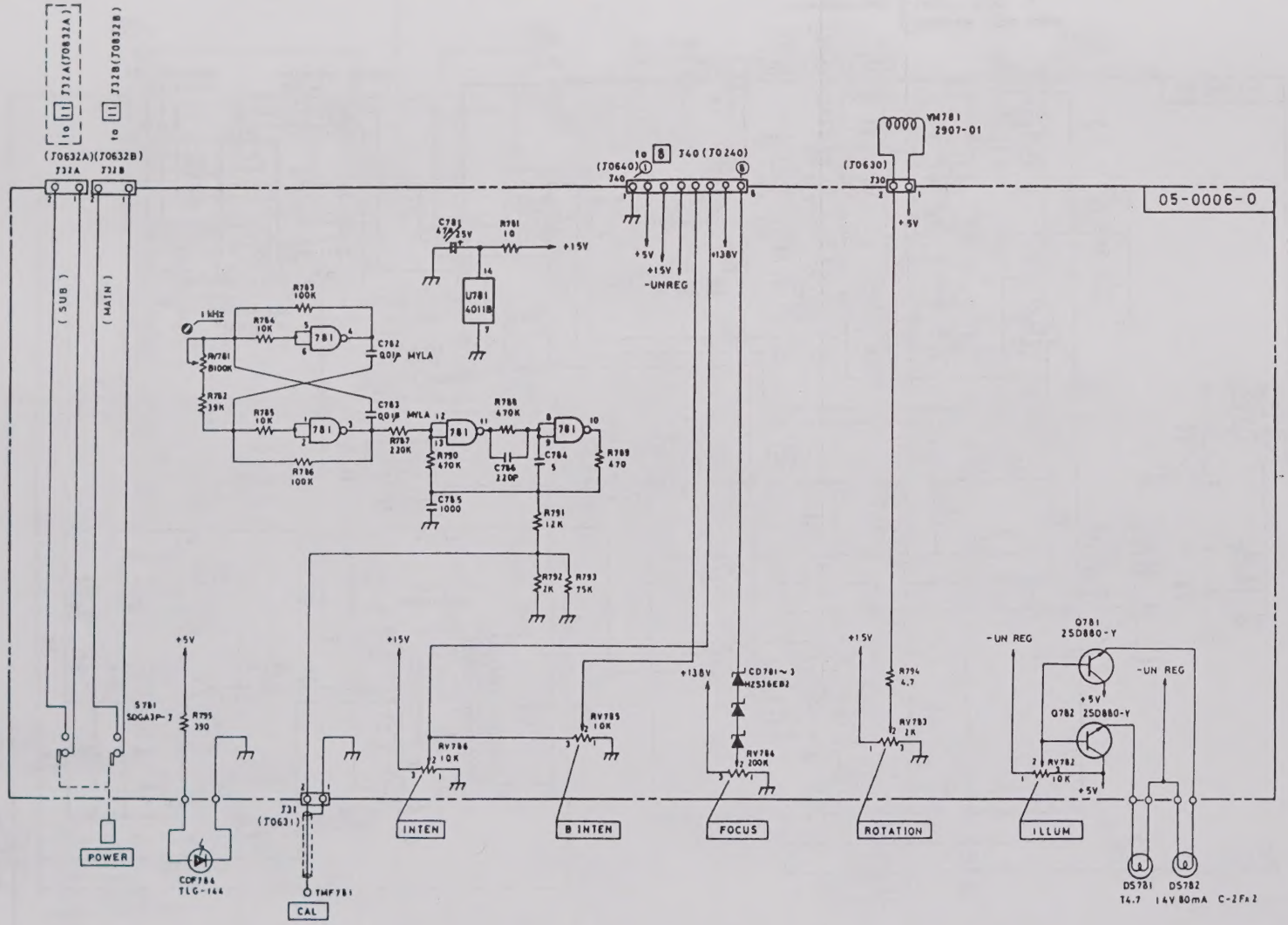
INTERCONNECT SCHEME DIAGRAM



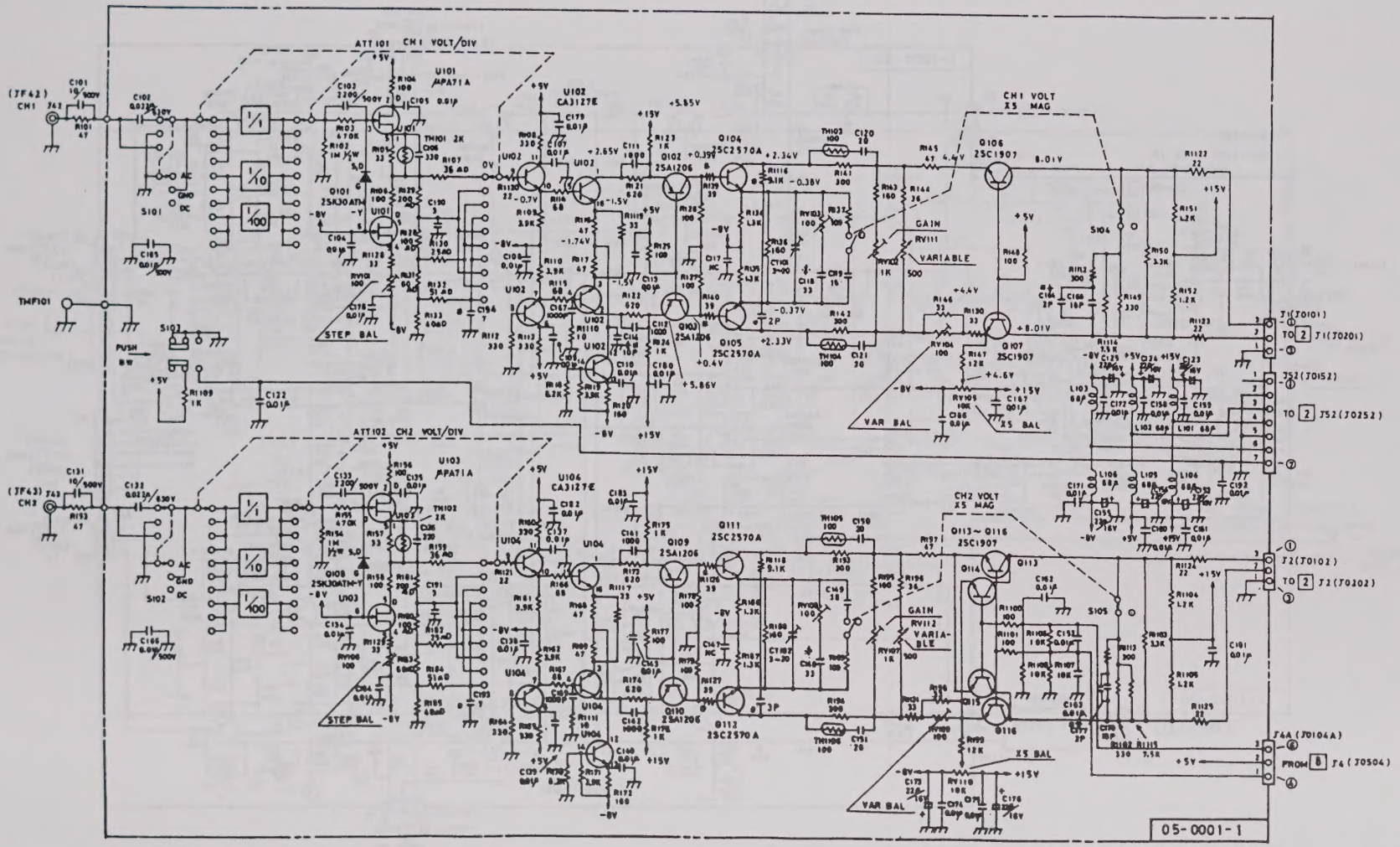
POWER SUPPLY



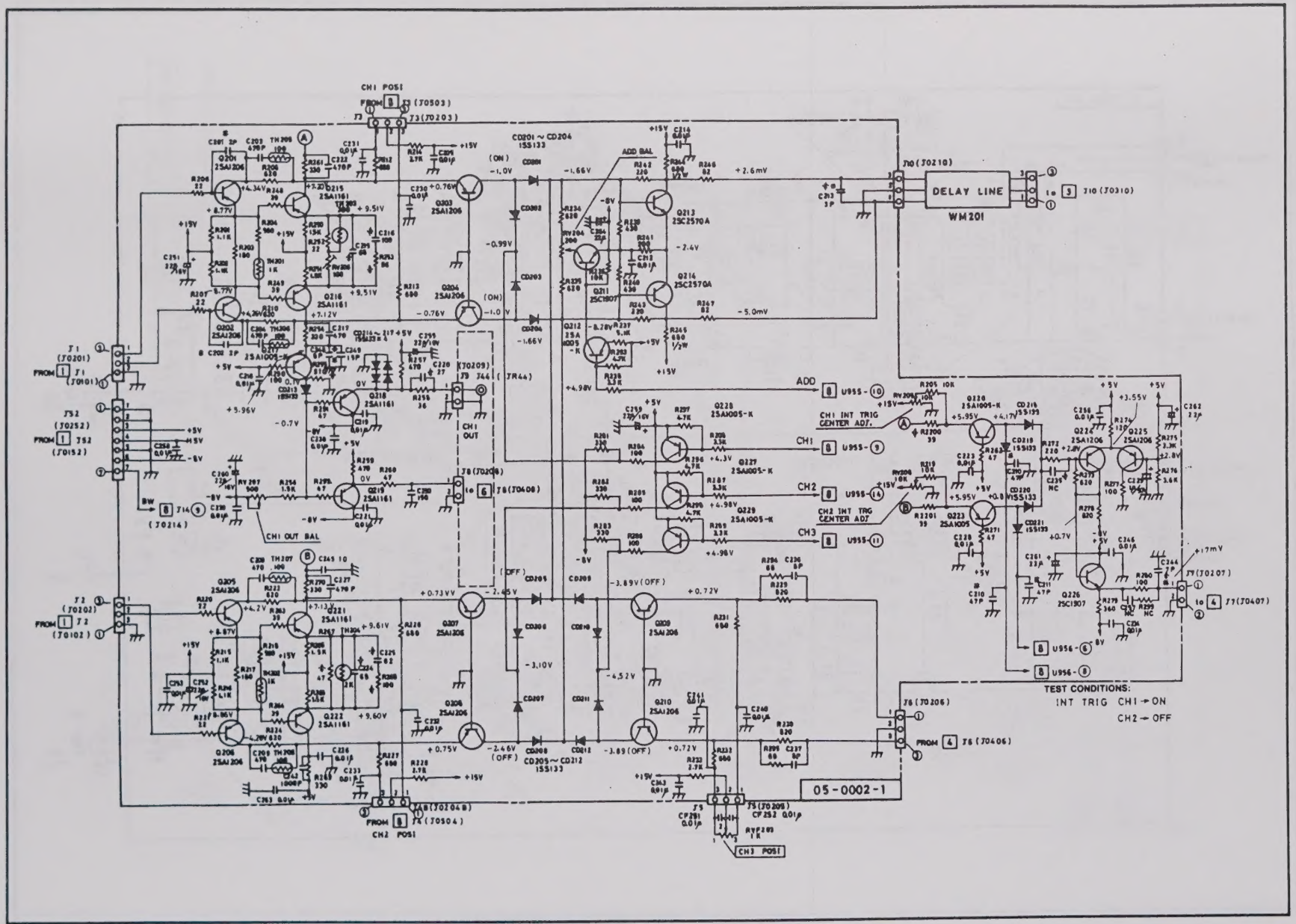
HIGH VOLTAGE CIRCUITS



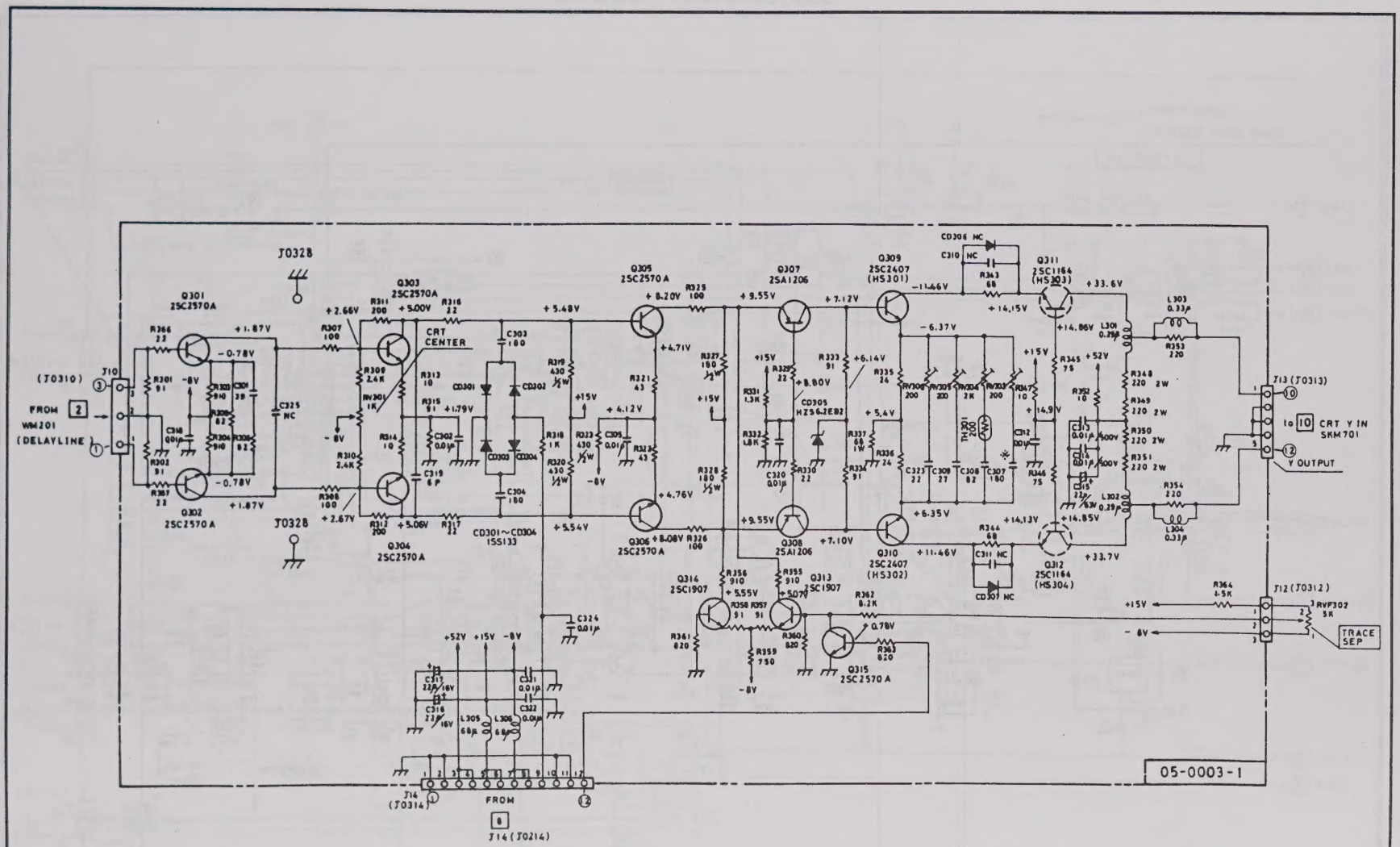
CRT CONTROL AND CAL CIRCUITS



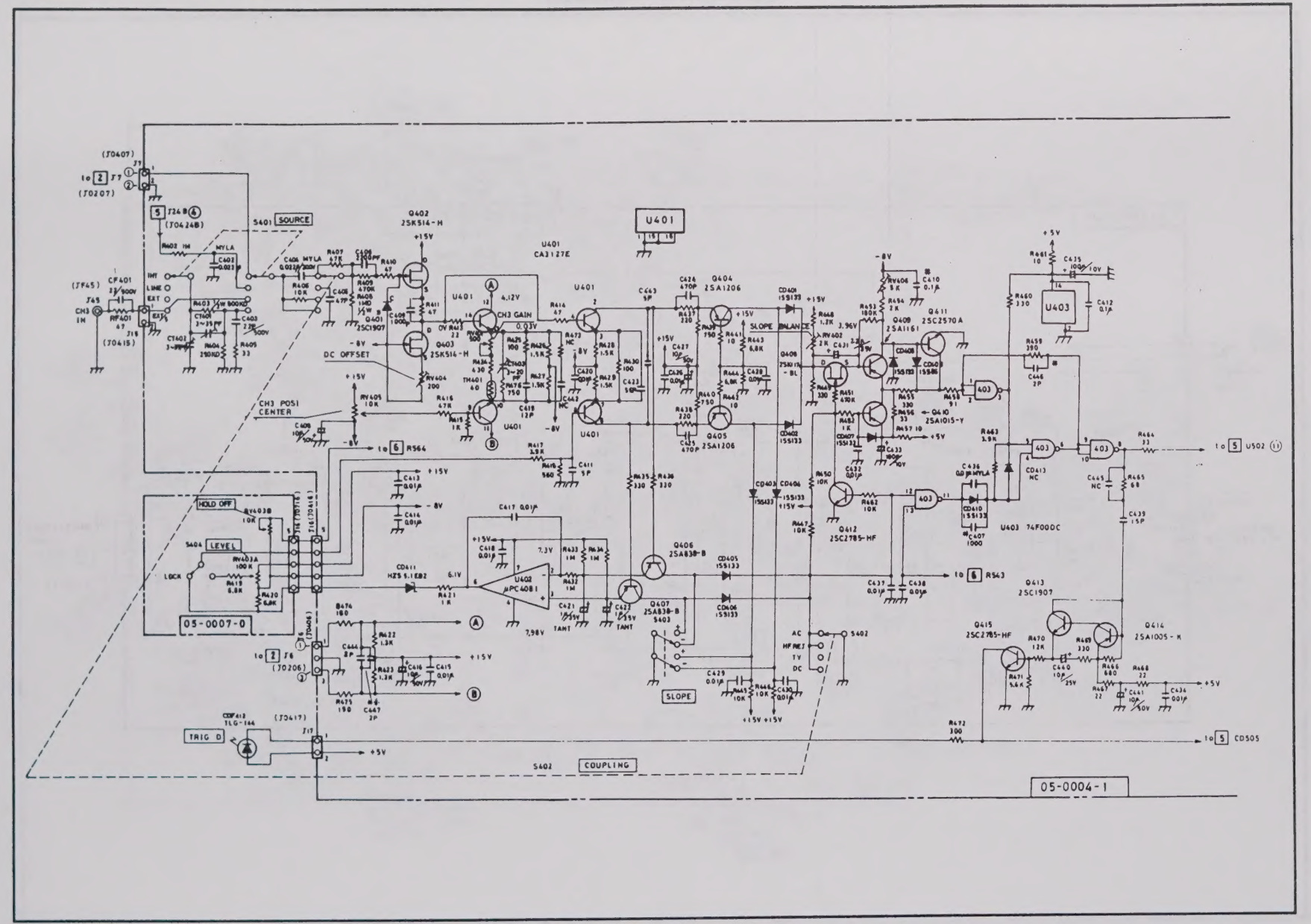
VERTICAL PREAMP



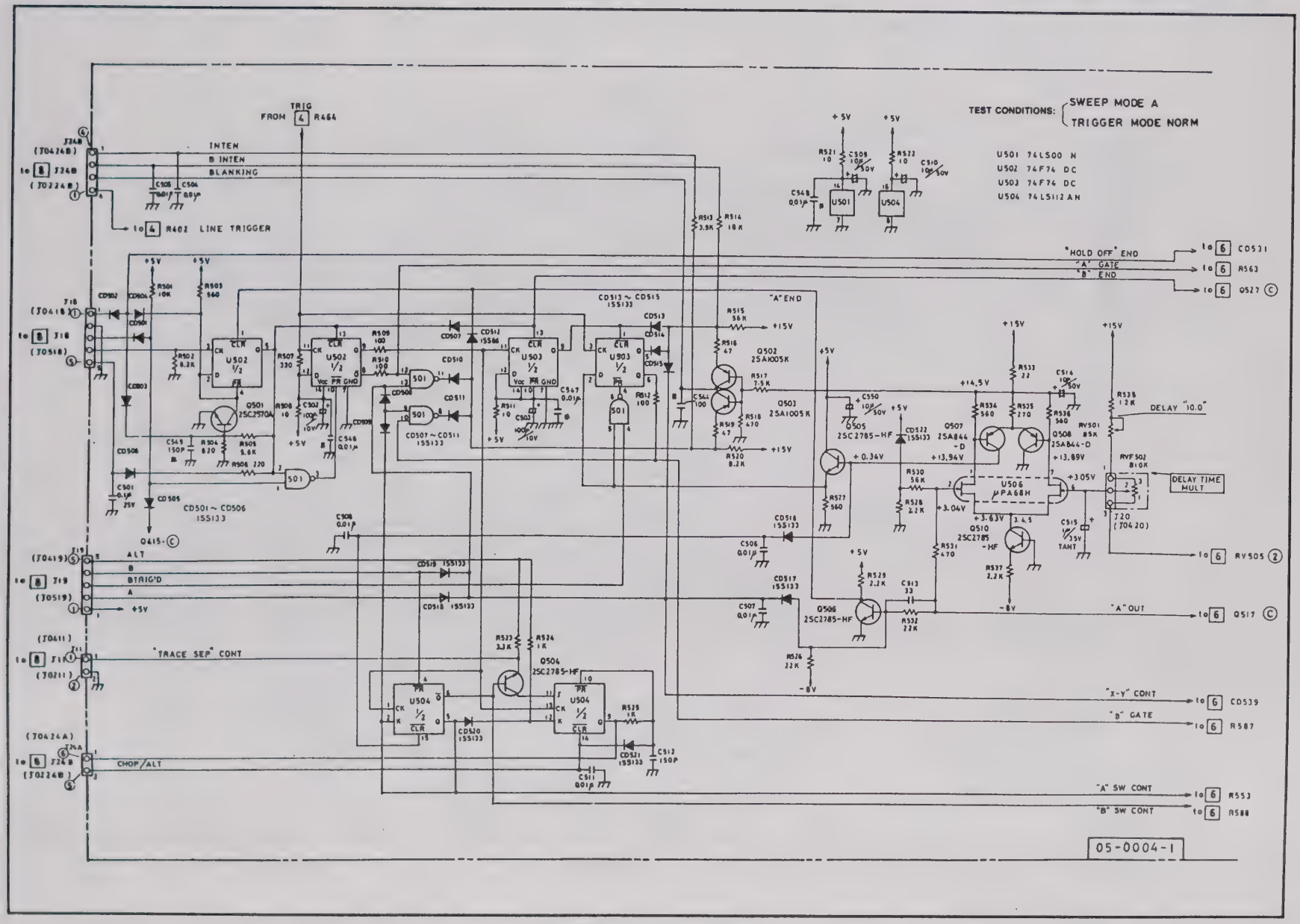
VERTICAL MID AMP, TRIGGER PICKOFF CIRCUITS



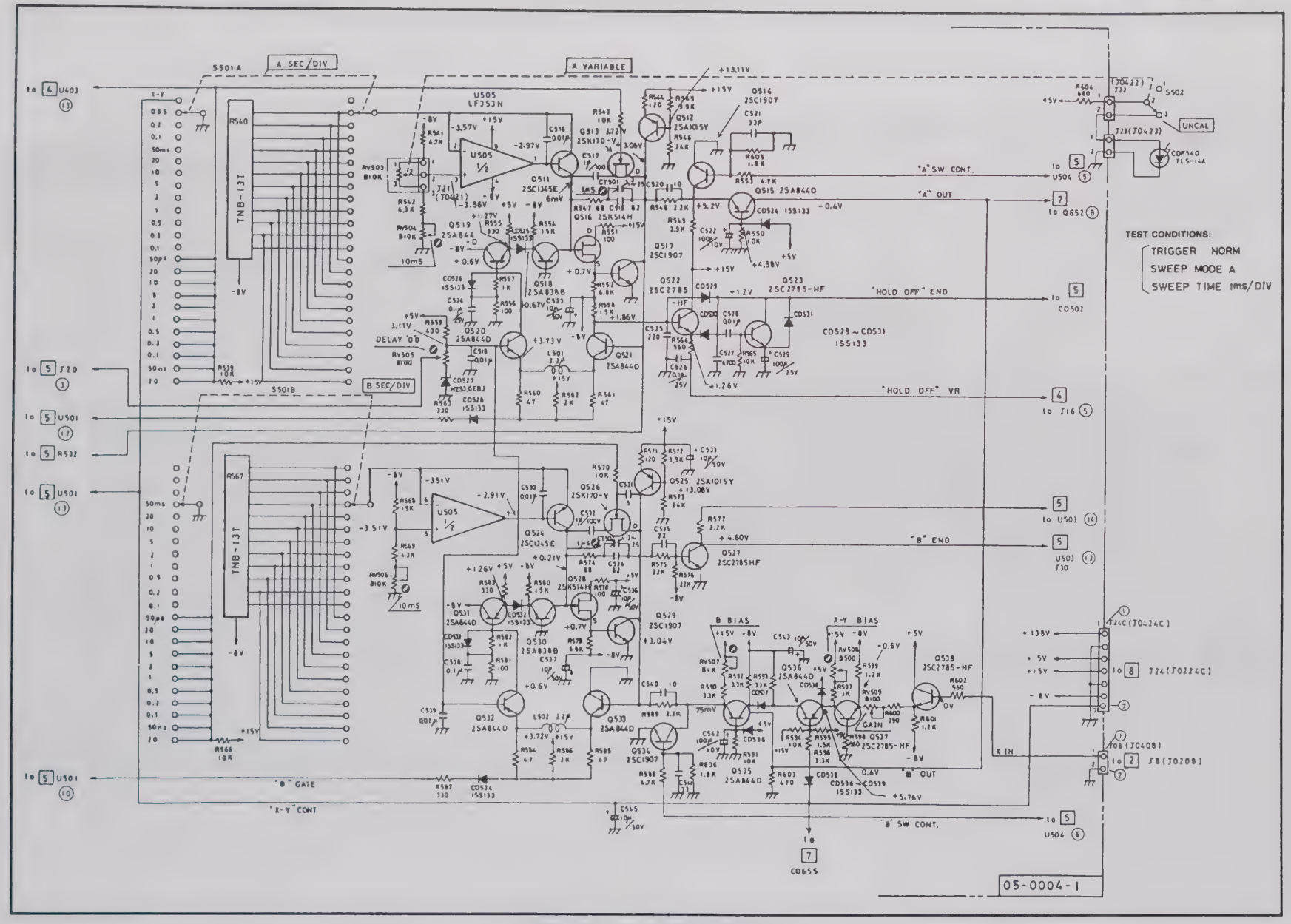
VERTICAL FINAL AMP



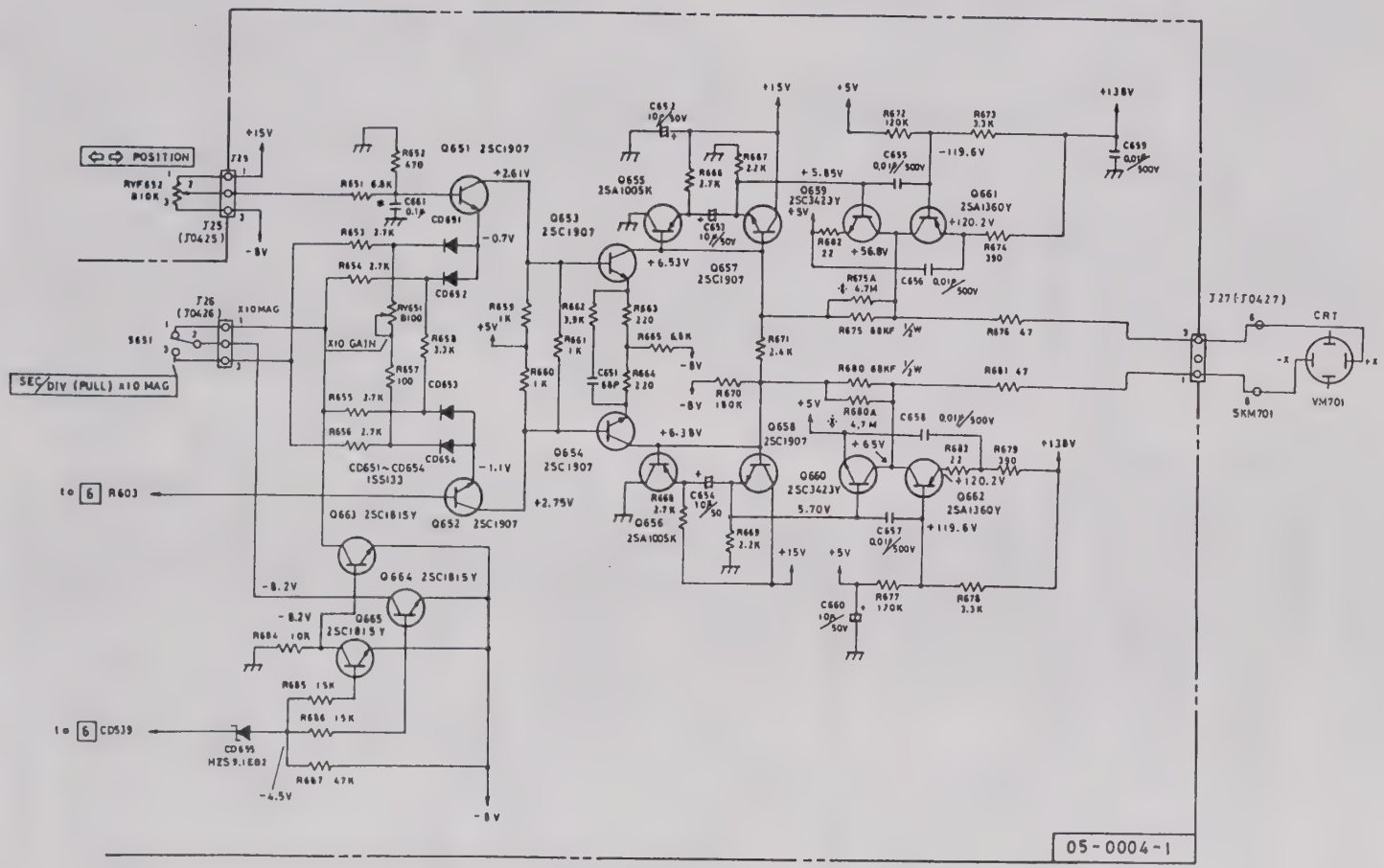
TRIGGER AMP CIRCUITS



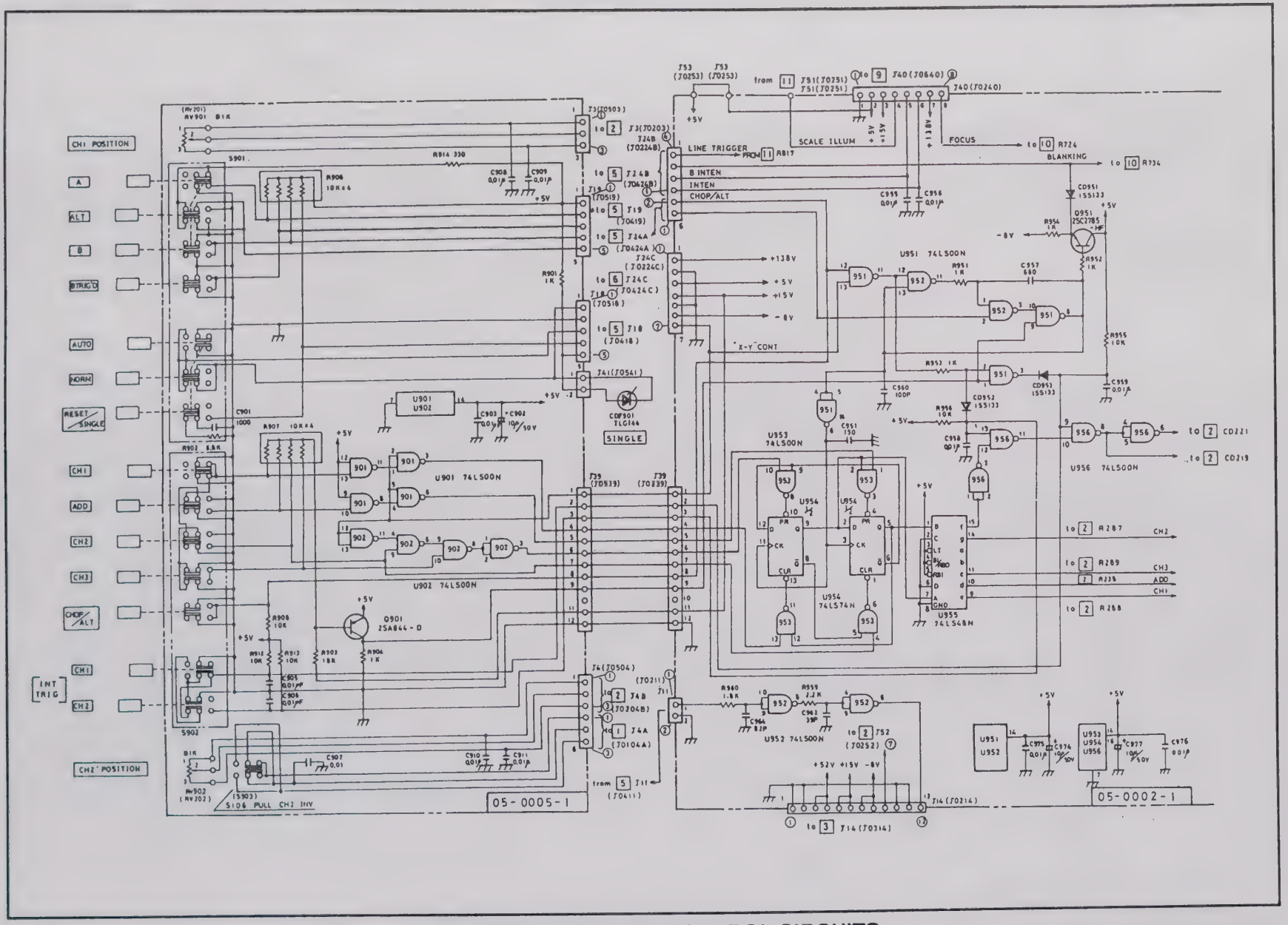
TIME BASE (PART 1)



TIME BASE (PART 2)



HORIZONTAL AMP



MODE SWITCHING AND CONTROL CIRCUITS

CALIBRATION PROCEDURE

Initial Settings

CRT UNIT

POWER	On
INTENSITY	12 o'clock position
B INTENSITY	Max.
FOCUS	12 o'clock position

VERTICAL (CH1, CH2)

POSITION	12 o'clock position
VERTICAL MODE	CH1
VOLTS/DIV	10 mV
VARIABLE	CAL
COUPLING	GND

HORIZONTAL

POSITION	12 o'clock position
HORIZONTAL MODE	A
A, B SEC/DIV	0.5 ms
VARIABLE	CAL
X 10 MAG	Off
DELAY TIME MULT	[0.0]

TRIGGER

TRIGGER MODE	AUTO
TRIGGER SLOPE	+
TRIGGER COUPLING	AC
TRIGGER SOURCE	INT
TRIGGER LEVEL	FIX
HOLD OFF	NORM
INT TRIG	CH1

Check and Adjustment of Power Supplies and CRT Circuit.

+15 V Check and Adjustment (RV801)

Connect a digital multimeter to TP1 and check that the dc voltage is within the range +14.9 to +15.1 V; if not adjust.

NOTE

The main unit power supply adjustment is also used for CAL signal voltage adjustment, so when adjusting RV801 for +15.0 V, also adjust the CAL signal voltage level to 2 V p-p.

–8 V, +5 V, +52 V, and +13.8 V Check

Connect a digital multimeter to TP2, TP3, TP4, and TP5 and check that the dc voltages are in the ranges –8.0 to –8.4 V, +4.8 to +5.2 V, +51 to +53 V, and +136 to +140 V, respectively.

CAL Signal Voltage Adjustment (RV801)

Using an oscilloscope with a calibrated voltage axis and a probe, adjust the CAL signal voltage to 2000 mVp-p, using RV801.

CAL Frequency Adjustment (RV781)

Using an oscilloscope with a calibrated time axis and a probe, adjust the CAL frequency to 1000 Hz, using RV781.

High-Voltage Check

Using a 1000:1 high-voltage probe and a digital multimeter, check that the TP6 dc high voltage is with the range –1770 to –1870 V.

COL Voltage Adjustment (RV704)

Connect a digital multimeter to TP7 and adjust RV704 for a dc level of +51V.

SUB INTEN Adjustment (RV702)

1. Settings

SWEEP TIME	X-Y
BANDWIDTH	ON
CH1/CH2 COUPLING	GND
INTENSITY knob	9 o'clock position
B INTENSITY	MAX

2. Adjust RV704 to the point just before the bright spot disappears.

SUB FOCUS Adjustment (RV701)

1. Settings

FOCUS knob	12 o'clock position
INTENSITY	12 o'clock position

2. Adjust RV701 so that the bright spot is focused.

ASTG Adjustment (RV703)

Once the bright spot is sufficiently focused, adjust RV703 so that it is round.

NOTE

Perform SUB FOCUS and ASTG adjustments alternately twice.

TRACE ROTATION Check

1. Setting

SEC/DIV	0.5 ms

2. Vary the TRACE ROTATION trimmer from MIN to MAX and check that the trace can be moved at least 1.4 division.

SCALE ILLUM Check

Check that the brightness of two lamps is equal when the SCALE ILLUM knob is turned to MAX. Check also for even brightness of the scale on the CRT screen.

Vertical Axis Check and Adjustment

VERTICAL FINAL AMP DC Adjustment (RV301)

1. Take out JO210 (DELAY LINE) from PCB No. 05-0002.
2. Adjust the trace to the center of the CRT screen using RV301.

3. Put JO210 back in its original place after completing adjustment.

TRIGGER AMP Zero-Offset Adjustment (RV404)

Connect a digital multimeter to U401 pin 14 and use RV404 to adjust the dc level to 0 V ±1 mV.

CH3 Gain Adjustment (RV401)

1. Setting

VERTICAL MODE	CH3
TRIGGER SOURCE	CH3
TRIGGER COUPLING	DC

2. Connect a voltage calibrator output to CH3 with a 50-Ω cable and input a 1 kHz, 0.5 Vp-p square wave.
3. Adjust the CRT screen display to 5 divisions using RV401.

CH3 POSITION Adjustment (RV405)

1. Set CH3 POSITION knob to the 12 o'clock position.
2. Adjust the trace to the center of the CRT using RV405.

CH2/CH1 STEP BALANCE Adjustment (RV106/RV101)

Set VERTICAL MODE TO CH2/CH1, and when varying CH2/CH1 ATT in the 5 mV to 5 V range, use RV106/RV101 to adjust the trace dc level so that it does not move up and down when the attenuator is switched.

CH2/CH1 VARIABLE BALANCE Adjustment (RV109/RV104)

While turning the VARIABLE trimmer, use RV109/RV104 to adjust the trace dc level so that it does not move up and down.

CH2/CH1 X5 MAG BALANCE adjustment (RV110/RV105)

Turn the X5 MAG switch on and off and use RV110/RV105 to adjust the trace dc level so that it does not move up and down.

CH2/CH1 GAIN Adjustment (RV107/RV102)

1. Connect a voltage calibrator output to CH2/CH1 with a 50-Ω cable and input a 1-kHz, 50-mVp-p square wave. Make the CH2/CH1 coupling DC.
2. Set CH2/CH1 to 10 mV using the VOLTS/DIV switch and adjust to the 5 division the CRT screen using RV107/RV102.

NOTE

After completing this step, repeat STEP BALANCE, VARIABLE BALANCE, X5 MAG BALANCE and CH2/CH1 GAIN adjustments once again.

CH1 OUT GAIN Adjustment (RV206)

1. Settings

VERTICAL MODE	CH1
VOLTS/DIV	0.1 V

2. Connect the voltage calibrator output connector to the CH1 input connector with a 50-Ω cable.
3. Connect the CH1 OUT connector to the input connector of a monitor oscilloscope with a calibrated voltage axis with a 50-Ω cable. Set the monitor oscilloscope VOLTS/DIV to 0.1 V.
4. Input a 1-kHz, 0.5-Vp-p square wave from the voltage calibrator and adjust to 5 div on the monitor oscilloscope screen using RV206.

CH1/CH2 INT TRIG DC Level Adjustment (RV205/RV208)

1. Settings

VERTICAL MODE	CH3
TRIGGER SOURCE	CH3
INT TRIG	CH1/CH2

2. Set the trace to the center of the CRT screen scale using the CH3 POSITION knob.
3. Set TRIGGER SOURCE to INT, and adjust the trace to the center of the CRT screen using RV205.

CH1 OUT DC LEVEL Adjustment (RV207)

1. Setting

VERTICAL MODE	CH1

2. Connect CH1 OUT connector to the monitor oscilloscope CH1 input connector with a 50-Ω cable. Set the monitor oscilloscope CH1 VOLTS/DIV to 0.1 V.
3. Adjust CH1 OUT dc level to the monitor oscilloscope GND level using RV207.

ADD DC BALANCE Adjustment (RV204)

1. Setting

VERTICAL MODE	CH1,CH2 ADD

2. Set the CH1 and CH2 trace levels to the center of the CRT screen using CH1 POSITION and CH2 POSITION.
3. Use RV204 to adjust the ADD TRACE level to the center of the CRT screen.

X-Y BIAS Adjustment (RV508)

1. Settings

VERTICAL MODE	CH2
CH1/CH2 COUPLING	GND
CH2 POSITION knob	12 o'clock position
HORIZONTAL DISPLAY	X-Y
H-POSITION knob	12 o'clock position

2. Adjust the trace to the center of the CRT screen horizontal axis using RV508.

X-Y GAIN Adjustment (RV509)

1. Settings

CH1 VOLTS/DIV	10mV
CH1 COUPLING	AC

2. Connect the voltage calibrator output connector to the CH1 connector with a 50-Ω cable and input a 1-kHz, 50-mVp-p square wave.

3. Adjust the trace to 5 div using RV509.

CH1/CH2 Preamplifier Frequency Response Adjustment (CT101, RV103/CT102, RV108)

1. Settings

CH1/CH2 VOLTS/DIV	10 mV
VERTICAL MODE	CH1/CH2
SEC/DIV	50 ns

2. Connect the pulse generator output connector and the CH1/CH2 input connector with a 50-Ω cable (50-Ω load).

3. Input a square wave with 1-ns risetime and 1-ns period, and set the amplitude to 6 div on the CRT screen using the pulse generator level adjuster.

4. Adjust the square wave characteristics to within the following ratings using CT101, RV103/CT102, RV108. Perform this adjustment for VERTICAL FINAL AMP frequency characteristic also.

Risetime	3.5 ns max.
Overshoot	Within 5%
Other distortion	Within 2%

NOTE

Adjust so that the CT101, RV103/CT102, and RV108 adjustment ranges are such that overshoot is 5% in the high range.

VERTICAL FINAL AMP Frequency Response Adjustment (RV303 to RV306)

1. Adjust the square wave characteristics in the same way as for CH1/CH2 preamplifier frequency characteristic using RV303 to RV306.

RV303 adjustment range	20 to 40 MHz
RV304 adjustment range	1 to 10 MHz
RV305 adjustment range	90 to 100 MHz
RV306 adjustment range	100 to 120 MHz

CH3 Frequency Response Adjustment (CT403)

1. Settings

VERTICAL MODE	CH3
TRIGGER SOURCE	CH3

2. Connect the pulse generator output connector and the CH3 input connector with a 50-Ω cable (50-Ω load).

3. Input a square wave with risetime less than 1 ns and 1-µs period, and set the amplitude to 6 div on the CRT screen using the pulse generator level adjuster.

4. Adjust the square wave characteristics to within the following ratings using CT403.

Risetime	3.5 ns max.
Overshoot	Within 10%
Other distortion	Within 5%

CH1/CH2 ATT (1/10, 1/100) Frequency Response Adjustment

1. Settings

VERTICAL MODE	CH1/CH2
SEC/DIV	20 µs
TRIGGER SOURCE	INT
CH1/CH2 VOLTS/DIV	0.1 V/div (for 1/10 adjustment) 1 V/div (for 1/100 adjustment)

2. Connect the pulse generator output connector and the CH1 input connector with a 50-Ω cable (50-Ω load).

3. Input a square wave with risetime less than 1 ns and 0.1-ms period, and set the amplitude to 4 div on the CRT screen using the pulse generator level adjuster.

4. Adjust the square wave characteristic so that it is flat using trimmer T1/T3 for the 0.1 V adjustment and trimmer T2/T4 for the 1-V adjustment.

CH1/CH2 ATT (1/10, 1/100) Input Capacitance Adjustment

1. Settings

CH1/CH2 VOLTS/DIV	10 mV
VERTICAL MODE	CH1/CH2
A SEC/DIV	0.2 ms

2. Connect a 10:1 probe to the CH1/CH2 input connector and set the probe attenuation ratio to 10:1.

3. With the CH1/CH2 VOLTS/DIV set to 10 mV, connect the probe to the pulse generator output connector and input a 1-kHz square wave.

4. Adjust the square wave characteristic so that it is flat using the probe compensation trimmer.

5. With the CH1/CH2 VOLTS/DIV at 0.1 V, set the square wave amplitude to 5 div and adjust the square wave characteristic to be flat using T5/T7.

CH3 + 5 ATT Frequency Characteristic Adjustment

1. Settings

VERTICAL MODE	CH3
TRIGGER SOURCE	CH3 + 5
A SEC/DIV	20 µS

2. Connect the pulse generator output connect to the CH3 input connector with a 50-Ω cable (50-Ω load).

3. Input a square wave with risetime less than 1 ns and 0.1-ms period, and set the amplitude to 2 div on the CRT screen using the pulse generator level adjuster.

4. Adjust the square wave characteristic so that it is flat using CT401.

CH3 + 5 ATT Input Capacitance Adjustment

1. Settings

TRIGGER SOURCE	CH3
A SEC/DIV	0.2 ms

2. Connect a 10:1 probe to the CH3 input connector and set the attenuation ratio to 10:1.
3. Connect the probe to the pulse generator output connector and apply a 1-kHz, 5-Vp-p square wave.
4. Adjust the probe capacitance so that the square wave characteristic is flat.
5. Set the TRIGGER SOURCE to CH3 + 5, and set the pulse generator level to 20 Vp-p. Adjust the square wave characteristic so that it is flat using CT402.

CH1/CH2 Frequency Response Check

1. Settings

VERTICAL MODE	CH1/CH2
CH1/CH2 VOLTS/DIV	10 mv
TRIGGER SOURCE	INT

2. Connect the sine wave generator output connector to CH1/CH2 with a 50-Ω cable (50-Ω load).

Set the sine wave generator frequency to 50 kHz and set the amplitude to 6 div using the sine wave generator output level adjuster.

4. Set the sine wave generator frequency to 100 MHz and check that the amplitude is greater than 4.2 div (less than -3 dB).

CH3 Frequency Response Check

1. Settings

VERTICAL MODE	CH3
TRIGGER SOURCE	CH3

2. Connect the sine wave generator output connector to CH3 with a 50-Ω cable (50-Ω load).
3. Set the sine wave generator frequency to 50 kHz and set the amplitude to 6 div using the sine wave generator output level adjuster.
4. Set the sine wave generator frequency to 100 MHz and check that the amplitude is greater than 4.2 div (less than -3 dB).

Horizontal Axis Adjustments

A SEC/DIV 0.5 ms Adjustment (RV504)

1. Settings

VERTICAL MODE	CH1
CH1 VOLTS/DIV	0.5 V
TRIGGER SOURCE	INT
A SEC/DIV	0.5 ms

2. Connect the time marker generator output connector to the CH1 input connector with a 50-Ω cable (50-Ω load).
3. Adjust using RV504 so that the ten time markers align with the CRT scale.
4. At each step between 0.5 s and 0.1 ms, check that the time marker waveform is within ±0.05 div on the CRT screen scale.

B BIAS Adjustment (RV507)

1. Settings

SWEEP MODE	ALT
A SEC/DIV	0.5 ms
B SEC/DIV	0.5 ms

2. Set the A sweep initial time mark to the leftmost position on the CRT screen scale using the HORIZONTAL POSITION knob.
3. Set the B SWEEP VERTICAL POSITION to about 0.2 div below the A SWEEP VERTICAL POSITION using the TRACE SEPARATION knob.
4. Adjust the B SWEEP initial time marker to the A SWEEP initial time using RV507.

DELAY TIME MULT [0.0] Adjustment (RV505)

1. While turning the DELAY TIME MULT dial through 0.0, 1.0, 2.0, ..., adjust RV505 so that the B SWEEP time marker moves to the left less than 3/100 of a rotation.

B TIME/DIV 0.5 ms Adjustment (RV506)

1. Adjust RV505 so that the ten time markers align with the CRT scale.
2. For each step between 50 ms and 0.1 ms, check that the time marker waveform and the CRT screen scale are within ±0.2 div (within ±0.05 div at 0.5 ms).

DELAY TIME MULT [10.0] Adjustment (RV501)

With the DELAY TIME MULT dial at [10.0], adjust RV501 so that the tenth B SWEEP time marker waveform is over the A SWEEP time marker waveform initial time marker.

NOTE

Check the DELAY TIME MULT [0.0] adjustment again after completing this adjustment.

A SEC/DIV 1 µs Adjustment (CT501)

1. Settings

SWEEP MODE	A
A SEC/DIV	1µs

2. Input a 1-µs time marker.
3. Adjust CT501 so that the ten time markers align with the CRT scale.
4. For each step between 50 µs and 20 ns, check that the time marker waveform and the CRT screen scale are within ±3% (within ±0.05 div at 1 µs).

B SEC/DIV 1 µs Adjustment (CT502)

1. Settings

SWEEP MODE	B
B SEC/DIV	1 µs

2. Adjust CT502 so that the ten time markers align with the CRT scale.

3. For each step between 50 µs and 20 ns, check that the time marker waveform and the CRT screen scale are within ±3% (within ±0.05 div at 1 µs).

PULL X 10 MAG HORIZONTAL GAIN Adjustment (RV651)

1. Settings

SWEEP MODE	A
A SEC/DIV	1 µs X 10 MAG
HORIZONTAL POSITION	12 o'clock position

2. Set the time marker generator to 0.1 µs.
3. Adjust RV651 so that the ten time markers align with the CRT scale.
4. Push the X 10 MAG knob after completing this adjustment.

Trigger Circuit Adjustments

Trigger Slope Sensitivity Adjustment (RV402)

1. Settings

TRIGGER SOURCE	CH3
TRIGGER COUPLING	AC
TRIGGER LEVEL	FIX
A SEC/DIV	1 µs

2. Connect the signal generator output connector to CH3 with a 50-Ω cable (50-Ω load).
3. Set the signal generator frequency to 1 MHz, and set the level to 1 div on the screen.
4. When the slope is switched between + and –, the input signal level will decrease. Adjust RV402 so that the sync level is the same for + SLOPE and – SLOPE.

TV Sync Sensitivity Adjustment (RV406)

1. Settings

VERTICAL MODE	CH1
A SEC/DIV	20 µs
TRIGGER SOURCE	INT
TRIGGER COUPLING	TV
TRIGGER SLOPE	—
TRIGGER LEVEL	FIX

2. Connect a TV pattern generator output connector to CH1 with a 75-Ω cable (75-Ω load).
3. Adjust CH1 VARIABLE so that the color bar signal is at 1.8 divp-p on the CRT screen.
4. Adjust RV406 so that synchronization is achieved at H-SYNC.
5. Check that V-SYNC is synchronous when A SEC/DIV is in the range 20 ms and 0.1 ms, and that H-SYNC is synchronous when A SEC/DIV is in the range 50 µs and 0.5 µs.

The Z Axis

Z Axis Sensitivity Check

1. Settings

CH1 VOLTS/DIV	1 V
CH1 COUPLING	AC
A SEC/DIV	0.5 ms
INTENSITY	12 o'clock position

2. Connect an RC oscillator output connector to a T-divider and then connect this to the CH1 input with a cable.
3. Set the RC oscillator frequency to 1 kHz and the signal level to 6 Vp-p.
4. Connect the other side of the T-divider connected to the RC oscillator output connector to the Z-AXIS input connector with a cable.
5. Check that the sinewave positive side on the CRT screen is blanked and that its negative side is bright.

BK PRECISION®

PARTS LIST
for
MODEL 2190
100 MHz
Three Channel
OSCILLOSCOPE

Addendum to Schematic Diagrams and

Calibration Procedure

499-412-9-001

BK PRECISION®

491-360-9-001

MAIN CHASSIS AND ACCESSORIES

SCHEMATIC SYMBOL	DESCRIPTION	B & K-PRECISION PART NO.
	RESISTORS	
RVF203	1k ohm Potentiometer	008-910-9-008
RVF302	5k ohm Potentiometer	008-910-9-009
RVF502	10-Turn 10k ohm Potentiometer	008-910-9-010
RVF652	10k ohm Potentiometer	008-910-9-011
RF401	47 ohm, 1%, 1/4W Metal Film	013-173-9-009
	INDUCTORS & DELAY LINE	
WM201	Delay line	040-010-9-001
VM781	Coil, Trace rotation	047-093-9-001
TR801	Transformer, Power	065-252-9-001
	INDICATORS	
CDF412,784,901	LED, Green	158-119-9-002
CDF540	LED, Red	158-119-9-001
	MISCELLANEOUS	
	Fuse, 1A, 250V 5x20mm	198-300-1-000
VM701	E8303B31A Cathode ray tube	230-042-9-001
	Case bottom	252-075-9-001
	Case top	253-157-9-001
	Front Sub-panel	254-147-9-001
	Rear panel	254-147-9-002
	Inlay, front CRT control/power	260-544-9-001
	Inlay, front logo/model #	260-544-9-002
	Inlay, front main control	260-544-9-003
	Feet, plastic (set of 4)	380-659-9-003
	Plastic front panel	380-659-9-004
	Button for lever switch	384-141-9-001
	Push button, short	384-141-9-002
	Push button, long	384-141-9-003
	AC Power cord set	420-039-9-001
J0101- J0201 & J0102-J0202	Wire assembly	428-026-9-001
J0203-J0503	Wire assembly	428-026-9-002
J0204(A&B)-J0504	Wire assembly	428-026-9-003
J0205-CH 3 POS. Pot.	Wire assembly	428-026-9-004
J0206-J0406	Wire assembly	428-026-9-005
J0207-J0407	Wire assembly	428-026-9-006
J0208-J0408	Wire assembly	428-026-9-007
J0209-CH 1 Out	Wire assembly	428-026-9-008
J0211-J0411	Wire assembly	428-026-9-009
J0312-TRACE SEP. Pot.	Wire assembly	428-026-9-010
J0313-CRT Y Plates	Wire assembly	428-026-9-011
CH 3 BNC- J0415	Wire assembly	428-026-9-012
J0416-J0716	Wire assembly	428-026-9-013
J0417-TRIG LED	Wire assembly	428-026-9-014
J0518-J0418 & J0519-J0419	Wire assembly	428-026-9-015
J0420-DELAY TIME Pot.	Wire assembly	428-026-9-016
J0423-UNCAL LED	Wire assembly	428-026-9-017
J0224B-J0424B	Wire assembly	428-026-9-018
J0224C-J0424C	Wire assembly	428-026-9-019
J0425-H POS Control	Wire assembly	428-026-9-020
J0426-PULL X10 MAG	Wire assembly	428-026-9-021
J0427-CRT X Plates	Wire assembly	428-026-9-022
J0631-2V CAL Out	Wire assembly	428-026-9-023
J0632B-Power Select PCB	Wire assembly	428-026-9-024
J0233-J0233	Wire assembly	428-026-9-025
J0234-CRT	Wire assembly	428-026-9-026
J0236-CRT	Wire assembly	428-026-9-027
J0237-Z AXIS In	Wire assembly	428-026-9-028
J0239-J0539	Wire assembly	428-026-9-029
J0240-J0640	Wire assembly	428-026-9-030
J0541-READY LED	Wire assembly	428-026-9-031
J0252-J0152	Wire assembly	428-026-9-032
	Instruction Manual	480-650-9-001
05-0001-02	Pre-ampl. PCB Assembly	524-070-9-001
05-0002-02	Main PCB Assembly	524-071-9-001
05-0003-02	Final Ampl. PCB Assembly	524-072-9-001
05-0004-02	Timebase PCB Assembly	524-073-9-001
05-0005-02	Switch PCB Assembly	524-074-9-001
05-0006-02	CRT PCB Assembly	524-075-9-001
05-0007-02	Hold-off PCB Assembly	524-076-9-001
05-0008-02	Power select PCB Assembly	524-077-9-001
	Fuseholder	742-062-9-001
	Handle	746-095-9-001
	Handle pivot covers (1 pair)	746-095-9-002
	CRT Socket	749-125-9-001
H 3 POS. & Inner Hold-off	Knob, small with set screw	751-384-9-001
Outer Hold-off	Knob, medium with set screw	751-384-9-002
Intensity, Focus, etc.	Knob, medium	751-384-9-003
Inner V/ Div.	Knob, medium with set screw	751-384-9-004
Outer V/ Div.	Knob, large with set screw	751-384-9-005
Inner timebase	Knob, medium with set screw	751-384-9-006
Center timebase	Knob,large with set screw	751-384-9-007
Outer timebase	Knob, very large with set screw	751-384-9-008
	Line voltage selector plug	763-216-9-002
JR49	AC input receptacle	770-035-9-001
JF42,43,45 & JR44,45	BNC Connector	772-024-9-002
	Ground binding post	773-149-9-001
CAL 2V	Cal terminal	777-109-9-001
	Composite	499-412-9-001

SUBASSEMBLY NO. 524-070-9-001

	RESISTORS	
R101,153	47 ohm, 1%, 1/4W Metal Film	013-173-9-007
R102,154	1M ohm, 1%, 1/2W Metal Film	015-124-1-004
R103,155	470k ohm, 1%, 1/4W Metal Film	013-172-9-474
R104,106,125,126, 127,137	100 ohm, 1%, 1/4W Metal Film	013-172-9-101
R105,146,157,198, 1117	33 ohm, 1%, 1/4W Metal Film	013-172-9-330
R107,159	43 ohm, 0.5%, 1/4W Metal Film	013-173-9-001
R108,112,113,149, 160,164	330 ohm, 1%, 1/4W Metal Film	013-172-9-331
R109,110,119,161, 162,171	3.9k ohm, 1%, 1/4W Metal Film	013-172-9-392
R114,115,166,167	68 ohm, 1%, 1/4W Metal Film	013-172-9-680
R116,117,145,168, 169,197	47 ohm, 1%, 1/4W Metal Film	013-172-9-470
R118,170	8.2k ohm, 1%, 1/4W Metal Film	013-172-9-822
R120,136,143,172, 188,195	160 ohm, 1%, 1/4W Metal Film	013-172-9-161
R121,122,173,174	620 ohm, 1%, 1/4W Metal Film	013-172-9-621
R123,124,175,176, 1109	1k ohm, 1%, 1/4W Metal Film	013-172-9-102
R128,180	100 ohm, 0.5%, 1/4W Metal Film	017-144-1-000
R129,181	200 ohm, 0.5%, 1/4W Metal Film	017-144-2-000
R130,182	25 ohm, 0.5%, 1/4W Metal Film	013-173-9-002
R131,183	60 ohm, 0.5%, 1/4W Metal Film	013-173-9-003
R132,184	64 ohm, 0.5%, 1/4W Metal Film	013-173-9-004
R133,185	40 ohm, 0.5%, 1/4W Metal Film	013-173-9-005
R134,135,186,187	1.3k ohm, 1%, 1/4W Metal Film	013-172-9-132
R139,140,1126, 1127	39 ohm, 1%, 1/4W Metal Film	013-172-9-390
R141,142,193,194, 1112	300 ohm, 1%, 1/4W Metal Film	013-172-9-301
R144,196	36 ohm, 1%, 1/4W Metal Film	013-172-9-360
R147,199	12k ohm, 1%, 1/4W Metal Film	013-172-9-123
R148,156,158,177, 178,179	100 ohm, 1%, 1/4W Metal Film	013-172-9-101
R150,1103	3.3k ohm, 1%, 1/4W Metal Film	013-172-9-332
R151,152,1104, 1105	1.2k ohm, 1%, 1/4W Metal Film	013-172-9-122

SUBASSEMBLY NO. 524-070-9-001 (continued)

SCHEMATIC SYMBOL	DESCRIPTION	B & K-PRECISION PART NO.
R165,1102	330 ohm, 1%, 1/4W Metal Film	013-172-9-331
R189,1100,1101	100 ohm, 1%, 1/4W Metal Film	013-172-9-101
R1106,1107,1108	10k ohm, 1%, 1/4W Metal Film	013-172-9-103
R1110,1111	10 ohm, 1%, 1/4W Metal Film	013-172-9-100
R1113	300 ohm, 1%, 1/4W Metal Film	013-172-9-301
R1114,1115	7.5k ohm, 1%, 1/4W Metal Film	013-172-9-752
R1119,1128,1129, 1130,1131	33 ohm, 1%, 1/4W Metal Film	013-172-9-330
R1120,1121,1122, 1123,1124	22 ohm, 1%, 1/4W Metal Film	013-172-9-220
R1125	22 ohm, 1%, 1/4W Metal Film	013-172-9-220
RV101,103,104, 106,108,109	100 ohm Cermet Trimmer Pot.	010-091-9-001
RV102,107	1k ohm Cermet Trimmer Pot.	010-091-9-002
RV105,110	10k ohm Cermet Trimmer Pot.	010-091-9-003
RV111,112	500 ohm Pot.(part of ATT101 or 102)	
TH101,102,	2k ohm Thermistor	005-028-9-001
TH103,104,105, 106	100 ohm Thermistor	005-028-9-002
	CAPACITORS	
C101,131	10pF, +/-0.5pF, 500V Ceramic	020-457-9-001
C102,132	0.022uF, 5%, 630V Polyester	025-312-9-001
C103,133	2200pF, 10%, 500V Ceramic	020-457-9-002
C104,105,107, 108,109,110	0.01uF, +80/-20%, 50V Ceramic	020-457-9-003
C106,136	330pF, 10%, 50V Ceramic	020-457-9-004
C111,112,141, 142,167,169	1000pF, 10%, 50V Ceramic	020-457-9-005
C113,122,134, 135,137,138	0.01uF, +80/-20%, 50V Ceramic	020-457-9-003
C114	10pF, +/-0.5pF, 50V Ceramic	020-457-9-006
C118,148	33pF, 5%, 50V Ceramic	020-457-9-007
C119,149,168, 170	18pF, 5%, 50V Ceramic	020-457-9-012
C120,121,150,151	20pF, 5%, 50V Ceramic	020-457-9-009
C123,124,125, 153,154,155	22uF, 20%, 16V Electrolytic	022-430-9-001
C139,140,143, 152,158,159	0.01uF, +80/-20%, 50V Ceramic	020-457-9-003
C160,161,162, 163,171,172	0.01uF, +80/-20%, 50V Ceramic	020-457-9-003
C164,177	2pF, +/-0.25pF, 50V Ceramic	020-457-9-010
C165,166	0.01uF, 10%, 50V Ceramic	020-457-9-011
C173,176	22uF, 20%, 16V Electrolytic	022-430-9-001
C174,175,178, 179,180,181	0.01uF, +80/-20%, 50V Ceramic	020-457-9-003
C182,183,184, 186,187,192	0.01uF, +80/-20%, 50V Ceramic	020-457-9-003
C190,191	3pF, +/-0.25pF, 50V Ceramic	020-457-9-013
C193,194	7pF, +/-0.5pF, 50V Ceramic	020-457-9-014
CT101,102	3-20pF Trimmer	028-123-9-001
	INDUCTORS	
L101,102,103, 104,105,106	68uHy, 10% Coil	047-092-9-001
	SWITCHES	
S101,102	Lever switch	080-035-9-001
S103	Push-push switch	088-202-9-001
S104,105 ATT101,102)	Pull-push switch(part of	
	TRANSISTORS	
Q101,108	2SK30ATM-Y FET	182-106-9-001
Q102,103,109,110	2SA1206 PNP Transistor	177-071-9-003
Q104,105,111,112	2SC2570A NPN Transistor	176-222-9-003
Q106,107,113, 114,115,116	2SC1907 NPN Transistor	176-174-9-001
	INTEGRATED CIRCUITS	
U101,103	uPA71A Dual FET	182-063-9-001
U102,104	I.C., CA3127E transistor array	307-338-9-003
	MISCELLANEOUS	
ATT101,102	Attenuator assembly	524-069-9-001
J0101,0102,0104A	3 pin PCB connector (small)	757-188-9-001
J0152	7 pin PCB connector (small)	757-188-9-006

SUBASSEMBLY NO. 524-071-9-001

SCHEMATIC SYMBOL	DESCRIPTION	B & K-PRECISION PART NO.
	RESISTORS	
R201,202,215,216	1.1k ohm, 1%, 1/4W Metal Film	013-172-9-112
R203,217	180 ohm, 1%, 1/4W Metal Film	013-172-9-181
R204,218,707,738, 741	560 ohm, 1%, 1/4W Metal Film	013-172-9-561
R205,219,236,704, 818,955	10k ohm, 1%, 1/4W Metal Film	013-172-9-103
R206,207,220,221, 252	22 ohm, 1%, 1/4W Metal Film	013-172-9-220
R208,210,222,224, 234,235	620 ohm, 1%, 1/4W Metal Film	013-172-9-621
R212,213,226,227, 231,232	680 ohm, 1%, 1/4W Metal Film	013-172-9-681
R214,228,233	2.7k ohm, 1%, 1/4W Metal Film	013-172-9-272
R229,230,278	820 ohm, 1%, 1/4W Metal Film	013-172-9-821
R237,733,802,820	5.1k ohm, 1%, 1/4W Metal Film	013-172-9-512
R238,275,287,288, 289,732	3.3k ohm, 1%, 1/4W Metal Film	013-172-9-332
R239,240	430 ohm, 1%, 1/4W Metal Film	013-172-9-431
R241	200 ohm, 1%, 1/4W Metal Film	013-172-9-201
R242,243,272,736, 814,828	220 ohm, 1%, 1/4W Metal Film	013-172-9-221
R244,245	680 ohm, 1%, 1/4W Metal Film	013-172-9-681
R246,247	82 ohm, 1%, 1/4W Metal Film	013-172-9-820
R248,249,263,264, 2200	39 ohm, 1%, 1/4W Metal Film	013-172-9-390
R250,251,256,265, 266	1.5k ohm, 1%, 1/4W Metal Film	013-172-9-152
R253	56 ohm, 1%, 1/4W Metal Film	013-172-9-560
R254,261,269,270, 281,282	330 ohm, 1%, 1/4W Metal Film	013-172-9-331
R255	910 ohm, 1%, 1/4W Metal Film	013-172-9-911
R257,259,702,805	470 ohm, 1%, 1/4W Metal Film	013-172-9-471
R258	36 ohm, 1%, 1/4W Metal Film	013-172-9-360
R260,262,267,271, 291,292	47 ohm, 1%, 1/4W Metal Film	013-172-9-470
R268,277,280,284, 285,286	100 ohm, 1%, 1/4W Metal Film	013-172-9-101
R273	620 ohm, 1%, 1/4W Metal Film	013-172-9-621
R274	120 ohm, 1%, 1/4W Metal Film	013-172-9-121
R276	3.6k ohm, 1%, 1/4W Metal Film	013-172-9-362
R279	360 ohm, 1%, 1/4W Metal Film	013-172-9-361
R290,734,810,826, 827	100 ohm, 1%, 1/4W Metal Film	013-172-9-101
R293,296,297,298	4.7k ohm, 1%, 1/4W Metal Film	013-172-9-472
R294,295	68 ohm, 1%, 1/4W Metal Film	013-172-9-680
R701	150k ohm, 1%, 1/4W Metal Film	013-172-9-154
R703	750 ohm, 1%, 1/4W Metal Film	013-172-9-751
R705,825	12k ohm, 1%, 1/4W Metal Film	013-172-9-123
R706,951,952,953, 954	1k ohm, 1%, 1/4W Metal Film	013-172-9-102
R708	1 ohm, 5%, 1W Metal Oxide	013-173-9-020
R709	22k ohm, 1%, 1/4W Metal Film	013-173-9-008
R710,711,715	2.2M ohm, 1%, 1/2W Metal Film	013-173-9-010
R712,713	1.00k ohm, 1%, 1/4W Metal Film	015-144-1-001
R714,718,725,743	100 ohm, 1%, 1/4W Metal Film	015-144-1-000
R716,717,721,722	10M ohm, 1%, 1/2W Metal Film	013-173-9-011
R719	6.8M ohm, 1%, 1/2W Metal Film	013-173-9-017
R720	18M ohm, 5%, 1W Metal Oxide	013-173-9-021
R723,724	10.0k ohm, 1%, 1/4W Metal Film	015-144-1-002
R726	100k ohm, 1%, 1/4W Metal Film	015-144-1-003
R737,744	47k ohm, 1%, 1/2W Metal Film	013-173-9-012
R739,822	22k ohm, 1%, 1/4W Metal Film	013-172-9-223
R740	33k ohm, 5%, 1W Metal Oxide	013-173-9-025
R742	12k ohm, 5%, 1W Metal Oxide	013-173-9-022
R801	240 ohm, 1%, 1/4W Metal Film	013-172-9-241
R803,807,812,821	8.2k ohm, 1%, 1/4W Metal Film	013-172-9-822
R806	33 ohm, 5%, 3W Metal Oxide	013-173-9-023
R808,809	5.6k ohm, 1%, 1/4W Metal Film	013-172-9-562
R811	27 ohm, 5%, 3W Metal Oxide	013-173-9-024
R813	15k ohm, 1%, 1/4W Metal Film	013-172-9-153
R815,817	680k ohm, 5%, 1/4W Carbon	002-104-5-684

SUBASSEMBLY NO.524-071-9-001 (continued)

SCHEMATIC SYMBOL	DESCRIPTION	B & K-PRECISION PART NO.
R816	4.7M ohm, 1%, 1/2W Metal Film	013-173-9-013
R819	3.9 ohm, 5%, 1/4W Carbon	002-104-5-399
R823	5.6 ohm, 5%, 1/4W Carbon	002-104-5-569
R824	200k ohm, 1%, 1/4W Metal Film	013-172-9-204
R956	10k ohm, 1%, 1/4W Metal Film	013-172-9-103
R959	2.2k ohm, 1%, 1/4W Metal Film	013-172-9-222
R960	1.8k ohm, 1%, 1/4W Metal Film	013-172-9-182
R2201	39 ohm, 1%, 1/4W Metal Film	013-172-9-390
RV204	200 ohm Cermet Trimmer Pot.	010-091-9-005
RV205,208	10k ohm Cermet Trimmer Pot.	010-091-9-003
RV206	100 ohm Cermet Trimmer Pot.	010-091-9-001
RV207	500 ohm Cermet Trimmer Pot.	010-091-9-006
RV701	1M ohm Cermet Trimmer Pot.	010-091-9-022
RV702,704	100k ohm Cermet Trimmer Pot.	010-091-9-020
RV703	200k ohm Cermet Trimmer Pot.	010-091-9-021
TH201,202	1k ohm Thermistor	005-028-9-004
TH203	200 ohm Thermistor	005-028-9-003
TH204	2k ohm Thermistor	005-028-9-001
TH205,206,207, 208	100 ohm Thermistor	005-028-9-002
	CAPACITORS	
C201,202	2pF, +/-0.25pF, 50V Ceramic	020-457-9-010
C203,204,208,209, 217,222	470pF, 10%, 50V Ceramic	020-457-9-015
C205,212,214,218, 219,221	0.01uF, +80/-20%, 50V Ceramic	020-457-9-003
C210	47pF, 5%, 50V Ceramic	020-457-9-016
C211	47pF, 5%, 50V Ceramic	020-457-9-017
C213	3pF, +/-0.25pF, 50V Ceramic	020-457-9-013
C215,224	68pF, 5%, 50V Ceramic	020-457-9-018
C216	100pF, 10%, 50V Ceramic	020-457-9-019
C220	27pF, 5%, 50V Ceramic	020-457-9-020
C223,226,228,230, 231,232	0.01uF, +80/-20%, 50V Ceramic	020-457-9-003
C225,964	82pF, 5%, 50V Ceramic	020-457-9-021
C227	470pF, 10%, 50V Ceramic	020-457-9-015
C229	1uF, 20%, 50V Electrolytic	022-430-9-002
C233,234,238,239, 240,241	0.01uF, +80/-20%, 50V Ceramic	020-457-9-003
C236,237	8pF, +/-0.5pF, 50V Ceramic	020-457-9-022
C242	1000pF, 10%, 500V Ceramic	020-457-9-023
C243,246,253,254, 256,258	0.01uF, +80/-20%, 50V Ceramic	020-457-9-003
C244	7pF, +/-0.5pF, 50V Ceramic	020-457-9-014
C245	10pF, +/-0.5pF, 50V Ceramic	020-457-9-006
C248	8pF, +/-0.5pF, 50V Ceramic	020-457-9-024
C249	15pF, 5%, 500V Ceramic	020-457-9-025
C250	150pF, 10%, 50V Ceramic	020-457-9-026
C251,252,255,259, 260,261	22uF, 20%, 16V Electrolytic	022-430-9-001
C262,264,730,732, 850,852	22uF, 20%, 16V Electrolytic	022-430-9-001
C263,726,727,731, 733,734	0.01uF, +80/-20%, 50V Ceramic	020-457-9-003
C701	6.8uF, 20%, 35V Tantalum	027-114-9-001
C702	2200pF, 10%, 50V Ceramic	020-457-9-027
C703	100uF, 20%, 25V Electrolytic	022-430-9-003
C704,719,724,737, 811,813	10uF, 20%, 50V Electrolytic	022-430-9-004
C705	0.1uF, 10%, 50V Polyester	025-312-9-002
C706	22pF, 10%, 3kV Ceramic	020-457-9-028
C707,708,709,713, 714	4700pF, +80/-20%, 3kV Ceramic	020-457-9-029
C710,718,720,721, 728,833	0.01uF, +100/-0%, 500V Ceramic	020-457-9-030
C711,712,715,716, 717	1000pF, +80/-20%, 3kV Ceramic	020-457-9-031
C725	220pF, 10%, 50V Ceramic	020-457-9-032
C801,802,803	2200uF, 20%, 25V Electrolytic	022-430-9-005
C804	100uF, 20%, 100V Electrolytic	021-089-9-001
C805	100uF, 20%, 250V Electrolytic	021-089-9-002
C806,807,808,809	1000pF, 10%, 50V Ceramic	020-457-9-005
C810	0.1uF, +80/-20%, 25V Ceramic	020-457-9-033
C812,814,817,820, 823,851	0.01uF, +80/-20%, 50V Ceramic	020-457-9-003
C815,816,818,819, 821,822	10uF, 20%, 50V Electrolytic	022-430-9-004
C824	0.047uF, 10%, 200V Polyester	025-312-9-003
C825	0.022uF, 10%, 50V Polyester	025-312-9-004
C826,831	1uF, 20%, 100V Electrolytic	021-089-9-003
C832	10uF, 20%, 63V Electrolytic	022-430-9-006
C834,835	1uF, 20%, 160V Electrolytic	021-089-9-005
C836	10uF, 20%, 160V Electrolytic	021-089-9-006
C837	0.01uF, +100/-0%, 500V Ceramic	020-457-9-030
C840,841	0.1uF, +80/-20%, 500V Ceramic	020-457-9-034
C853,854,955,956, 958,959	0.01uF, +80/-20%, 50V Ceramic	020-457-9-003
C957	680pF, 10%, 50V Ceramic	020-457-9-035
C960	100pF, 10%, 50V Ceramic	020-457-9-036
C961	150pF, 10%, 50V Ceramic	020-457-9-037
C962	39pF, 5%, 50V Ceramic	020-457-9-038
C974,977	10uF, 20%, 50V Electrolytic	022-430-9-004
C975,976	0.01uF, +80/-20%, 50V Ceramic	020-457-9-003
	INDUCTORS & TRANSFORMERS	
L701	100uHy, 10% Coil	047-092-9-002
T701	Transformer, DC - DC converter	064-034-9-001
	DIODES & TRANSISTORS	
CD201,202,203,204, 205,206	1SS133 Silicon diode	151-120-9-002
CD207,208,209,210, 211,212	1SS133 Silicon diode	151-120-9-002
CD213,214,215,216, 217,218	1SS133 Silicon diode	151-120-9-002
CD219,220,221,701, 703,704	1SS133 Silicon diode	151-120-9-002
CD702	5.6V, 500mW Zener diode	152-206-9-001
CD705,716,813,951, 952,953	1SS133 Silicon diode	151-120-9-002
CD706	6kV, 2mA Diode	151-168-9-001
CD707,708,709,710, 711,712	1SS83 Silicon diode	151-084-9-001
CD713,714	1SS83 Silicon diode	151-084-9-001
CD715,717	2.7V, 500mW Zener diode	152-206-9-002
CD801,802,803,804, 805	1A, 600V Silicon diode	151-050-9-001
CD806	5.1V, 500mW Zener diode	152-206-9-003
CD807	13V, 500mW Zener diode	152-206-9-004
CD808,815	18V, 500mW Zener diode	152-206-9-005
CD809	30V, 500mW Zener diode	152-206-9-006
CD810,811,812	43V, 500mW Zener diode	152-206-9-007
CD814	6.8V, 500mW Zener diode	152-206-9-008
Q201,202,203,304, 205,206	2SA1206 PNP Transistor	177-071-9-003
Q207,208,209,210, 224,225	2SA1206 PNP Transistor	177-071-9-003
Q211,226,702,703	2SC1907 NPN Transistor	176-174-9-001
Q212,217,220,223, 227,228	2SA1005-K PNP Transistor	177-063-9-001
Q213,214	2SC2570A NPN Transistor	176-222-9-003
Q215,216,218,219, 221,222	2SA1161 PNP Transistor	177-048-9-003
Q229	2SA1005-K PNP Transistor	177-063-9-001
Q701	2SD880-Y NPN Transistor	172-082-9-001
Q704,705,706,707	2SD668AC NPN Transistor	177-082-9-003
Q801,802,803,804	2SD560 NPN Transistor	172-086-9-001
Q805	2SD1088 NPN Transistor	172-086-9-002
Q806,807	2SC1515 NPN Transistor	176-237-9-001
Q951	2SC2785-HF NPN Transistor	176-154-9-002
	INTEGRATED CIRCUITS	
U701	I.C., uPC4081C Op-amp	307-486-9-001
U781	I.C., 4011B	308-114-9-001
U951,952,953,956	I.C., 74LS00	307-100-9-001
U954	I.C., 74LS74	307-119-9-001
U955	I.C., 74LS48	307-486-9-002
	MISCELLANEOUS	
For Q701,801,802, 803,804	Rubber insulator	342-200-9-001
For Q805	Rubber insulator	342-200-9-001

SUBASSEMBLY NO. 525-071-9-001 (continued)

SCHEMATIC SYMBOL	DESCRIPTION	B & K-PRECISION PART NO.
For Q801,802,803, 804	Insulating washer/bushing	346-036-9-001
For Q701,805	Insulating washer/bushing	346-036-9-002
	PCB Support, nylon	380-659-9-001
NE701,702	Neon tube, NE-2H	401-032-9-001
E701	High voltage module	524-078-9-001
For Q701	Heatsink	747-176-9-001
For Q801,802,803	Heatsink	747-176-9-002
For Q804,805	Heatsink	747-176-9-003
J0201,0202,0203, 0204B	3 pin PCB connector (small)	757-188-9-001
J0205,0206,0210	3 pin PCB connector (small)	757-188-9-001
J0207,0208,0209, 0211	2 pin PCB connector (small)	757-188-9-002
J0233,0233,0237	2 pin PCB connector (small)	757-188-9-002
J0224B	6 pin PCB connector (small)	757-188-9-003
J0239	12 pin PCB connector (small)	757-188-9-004
J0240	8 pin PCB connector (small)	757-188-9-005
J0224C,0252	7 pin PCB connector (small)	757-188-9-006
J0235	2 pin PCB connector (small)	757-189-9-001
J0236	3 pin PCB connector (small)	757-189-9-002
J0238B	4 pin PCB connector (small)	757-189-9-003
J0234	5 pin PCB connector (small)	757-189-9-004
J0238A	6 pin PCB connector (small)	757-189-9-005
J0214	12 pin female PCB connector (small)	757-192-9-001

SUBASSEMBLY NO. 524-072-9-001

RESISTORS

R301,302,315,333, 334,357	91 ohm, 1%, 1/4W Metal Film	013-172-9-910
R303,304,355,356	910 ohm, 1%, 1/4W Metal Film	013-172-9-911
R305,306	82 ohm, 1%, 1/4W Metal Film	013-172-9-820
R307,308,325,326	100 ohm, 1%, 1/4W Metal Film	013-172-9-101
R309,310	2.4k ohm, 1%, 1/4W Metal Film	013-172-9-242
R311,312	200 ohm, 1%, 1/4W Metal Film	013-172-9-201
R313,314,347,352	10 ohm, 1%, 1/4W Metal Film	013-172-9-100
R316,317,329,330, 366,367	22 ohm, 1%, 1/4W Metal Film	013-172-9-220
R318	1k ohm, 1%, 1/4W Metal Film	013-172-9-102
R319,320,323	430 ohm, 1%, 1/2W Metal Film	013-173-9-014
R321,322	43 ohm, 1%, 1/4W Metal Film	013-172-9-430
R327,328	180 ohm, 1%, 1/2W Metal Film	013-173-9-015
R331	1.3k ohm, 1%, 1/4W Metal Film	013-172-9-132
R332	1.8k ohm, 1%, 1/4W Metal Film	013-172-9-182
R335,336	24 ohm, 1%, 1/4W Metal Film	013-172-9-240
R337	68 ohm, 1%, 1W Metal Film	013-173-9-026
R343,344	68 ohm, 1%, 1/4W Metal Film	013-172-9-680
R345,346	75 ohm, 1%, 1/4W Metal Film	013-172-9-750
R348,349,350,351	220 ohm, 1%, 2W Metal Film	013-173-9-027
R353,354	220 ohm, 1%, 1/4W Metal Film	013-172-9-221
R358	91 ohm, 1%, 1/4W Metal Film	013-172-9-910
R359	750 ohm, 1%, 1/4W Metal Film	013-172-9-751
R360,361,363	820 ohm, 1%, 1/4W Metal Film	013-172-9-821
R362	8.2 ohm, 1%, 1/4W Metal Film	013-172-9-822
R364	1.5k ohm, 1%, 1/4W Metal Film	013-172-9-152
RV301	1k ohm Cermet Trimmer Pot.	010-091-9-012
RV303,305,306	200 ohm Cermet Trimmer Pot.	010-091-9-015
RV304	2k ohm Cermet Trimmer Pot.	010-091-9-018
TH301	200 ohm Thermistor	005-028-9-003

CAPACITORS

C301	39pF, 5%, 50V Ceramic	020-457-9-038
C302,305,314,318, 320,321	0.01uF, +80/-20%, 50V Ceramic	020-457-9-003
C303,304,307	180pF, 10%, 50V Ceramic	020-457-9-039
C308	82pF, 5%, 50V Ceramic	020-457-9-021
C309	27pF, 5%, 50V Ceramic	020-457-9-020
C312,313	0.01uF, +100/-0%, 500V Ceramic	020-457-9-030
C315,316,317	22uF, 20%, 16V Electrolytic	022-430-9-001
C319	6pF, +/-0.5pF, 50V Ceramic	020-457-9-040
C322,324	0.01uF, +80/-20%, 50V Ceramic	020-457-9-003
C323	22pF, 5%, 50V Ceramic	020-457-9-041

INDUCTORS

L301,302	0.29uHy, 10% Coil	047-092-9-003
L303,304	0.33uHy, 10% Coil	047-092-9-004
L305,306	68uHy, 10% Coil	047-092-9-001

DIODES & TRANSISTORS

CD301,302,303, 304	1SS133 Silicon diode	151-120-9-002
CD305	6.2V, 500mW Zener diode	152-206-9-009
Q301,302,303,304, 305,306	2SC2570A NPN Transistor	176-222-9-003
Q307,308	2SA1206 PNP Transistor	177-071-9-003
Q309,310	2SC2407 NPN Transistor	176-099-9-003
Q311,312	2SC1164 NPN Transistor	176-114-9-007
Q313,314	2SC1907 NPN Transistor	176-174-9-001
Q315	2SC2570A NPN Transistor	176-222-9-003

MISCELLANEOUS

For Q311,312	Heatsink	747-176-9-004
For Q309,310	Heatsink (Alternate style)	747-176-9-005
For Q309,310	Heatsink	747-176-9-006
J0312	3 pin PCB connector (small)	757-188-9-001
J0313	5 pin PCB connector (small)	757-188-9-007
J0310	3 pin 90° PCB connector (small)	757-190-9-001
J0314	12 pin female 90° PCB conn. (small)	757-193-9-001

SUBASSEMBLY NO. 524-073-9-001

RESISTORS

R402,432,433,434	1M ohm, 5%, 1/4W Carbon	002-104-5-105
R403	800k ohm, 0.5%, 1/2W Metal Film	013-173-9-018
R404	250k ohm, 0.5%, 1/4W Metal Film	013-173-9-006
R405	33 ohm, 1%, 1/4W Metal Film	013-172-9-330
R406,445,446,447, 450,539	10k ohm, 1%, 1/4W Metal Film	013-172-9-103
R407,416,687	47k ohm, 1%, 1/4W Metal Film	013-172-9-473
R408	1M ohm, 0.5%, 1/2W Metal Film	013-173-9-019
R409,451	470k ohm, 1%, 1/4W Metal Film	013-172-9-474
R410,411,414,560, 561,584	47 ohm, 1%, 1/4W Metal Film	013-172-9-470
R413,533,682,683	22 ohm, 1%, 1/4W Metal Film	013-172-9-220
R415,421,452,524, 525,557	1k ohm, 1%, 1/4W Metal Film	013-172-9-102
R417,545,549,572, 662	3.9k ohm, 1%, 1/4W Metal Film	013-172-9-392
R418,527,534,536, 564,598	560 ohm, 1%, 1/4W Metal Film	013-172-9-561
R422,423	1.3k ohm, 1%, 1/4W Metal Film	013-172-9-132
R424,559	430 ohm, 1%, 1/4W Metal Film	013-172-9-431
R425,430,551,556, 578,581	100 ohm, 1%, 1/4W Metal Film	013-172-9-101
R426,427,428,429, 595	1.5k ohm, 1%, 1/4W Metal Film	013-172-9-152
R435,436,449,555, 563,583	330 ohm, 1%, 1/4W Metal Film	013-172-9-331
R437,438,663,664	220 ohm, 1%, 1/4W Metal Film	013-172-9-221
R439,440	750 ohm, 1%, 1/4W Metal Film	013-172-9-751
R441,442	10 ohm, 1%, 1/4W Metal Film	013-172-9-100
R443,444,552,579, 651,665	6.8k ohm, 1%, 1/4W Metal Film	013-172-9-682
R448,599,601	1.2k ohm, 1%, 1/4W Metal Film	013-172-9-122
R453,670	180k ohm, 1%, 1/4W Metal Film	013-172-9-184
R523,590,592,596, 658,673	3.3k ohm, 1%, 1/4W Metal Film	013-172-9-332

SUBASSEMBLY NO. 524-073-9-001 (continued)

SCHEMATIC SYMBOL	DESCRIPTION	B & K-PRECISION PART NO.
R526,532,575,576	22k ohm, 1%, 1/4W Metal Film	013-172-9-223
R528,529,537,548, 577,589	2.2k ohm, 1%, 1/4W Metal Film	013-172-9-222
R530	56k ohm, 1%, 1/4W Metal Film	013-172-9-563
R531,603,652	470 ohm, 1%, 1/4W Metal Film	013-172-9-471
R535	270 ohm, 1%, 1/4W Metal Film	013-172-9-271
R538	12k ohm, 1%, 1/4W Metal Film	013-172-9-123
R540,567	Resistor Network	012-053-9-001
R541,553,588	4.7k ohm, 1%, 1/4W Metal Film	013-172-9-472
R542,569	4.3k ohm, 1%, 1/4W Metal Film	013-172-9-432
R543,550,565,566, 570,591	10k ohm, 1%, 1/4W Metal Film	013-172-9-103
R544,571	120 ohm, 1%, 1/4W Metal Film	013-172-9-121
R546,573	24k ohm, 1%, 1/4W Metal Film	013-172-9-243
R547,574	68 ohm, 1%, 1/4W Metal Film	013-172-9-680
R554,558,568,580, 685,686	15k ohm, 1%, 1/4W Metal Film	013-172-9-153
R562,586	2k ohm, 1%, 1/4W Metal Film	013-172-9-202
R582,597,659,660, 661	1k ohm, 1%, 1/4W Metal Film	013-172-9-102
R585,676,681	47 ohm, 1%, 1/4W Metal Film	013-172-9-470
R587	330 ohm, 1%, 1/4W Metal Film	013-172-9-331
R593	33k ohm, 1%, 1/4W Metal Film	013-172-9-333
R594,684	10k ohm, 1%, 1/4W Metal Film	013-172-9-103
R600,674,679	390 ohm, 1%, 1/4W Metal Film	013-172-9-391
R602	560 ohm, 1%, 1/4W Metal Film	013-172-9-561
R604	680 ohm, 1%, 1/4W Metal Film	013-172-9-681
R605,606	1.8k ohm, 1%, 1/4W Metal Film	013-172-9-182
R653,654,655,656, 666,668	2.7k ohm, 1%, 1/4W Metal Film	013-172-9-272
R657	100 ohm, 1%, 1/4W Metal Film	013-172-9-101
R667,669	2.2k ohm, 1%, 1/4W Metal Film	013-172-9-222
R671	2.4k ohm, 1%, 1/4W Metal Film	013-172-9-242
R672,677	120k ohm, 1%, 1/4W Metal Film	013-172-9-124
R675,680	68k ohm, 1%, 1/2W Metal Film	013-173-9-016
R675A,680A	4.7M ohm, 5%, 1/4W Carbon	002-104-5-475
R678	3.3k ohm, 1%, 1/4W Metal Film	013-172-9-332
RV401,508	500 ohm Cermet Trimmer Pot.	010-091-9-006
RV402	2k ohm Cermet Trimmer Pot.	010-091-9-008
RV404	200 ohm Cermet Trimmer Pot.	010-091-9-005
RV405,504,506	10k ohm Cermet Trimmer Pot.	010-091-9-003
RV406,501	5k ohm Cermet Trimmer Pot.	010-091-9-007
RV503	10k Pot. (part of S501)	
RV505,509,651	100 ohm Cermet Trimmer Pot.	010-091-9-001
RV507	1k ohm Cermet Trimmer Pot.	010-091-9-002
TH401	40 ohm Thermistor	005-028-9-005
	CAPACITORS	
C402	0.022uF, 10%, 50V Polyester	025-312-9-004
C403	22pF, 5%, 500V Ceramic	020-457-9-042
C404	0.022uF, 10%, 200V Polyester	025-312-9-005
C405	47pF, 5%, 50V Ceramic	020-457-9-016
C406	2200pF, 5%, 50V Polyester	025-312-9-006
C407	1000pF, 10%, 50V Ceramic	020-457-9-043
C408,416,427,441, 509,510	10uF, 20%, 50V Electrolytic	022-430-9-004
C409	1000pF, 10%, 500V Ceramic	020-457-9-023
C410,412,501,524, 526,538	0.1uF, +80/-20%, 25V Ceramic	020-457-9-033
C411,443,531	5pF, +/-0.25pF, 50V Ceramic	020-457-9-044
C413,414,415,417, 418,420	0.01uF, +80/-20%, 50V Ceramic	020-457-9-003
C419	12pF, 5%, 50V Ceramic	020-457-9-045
C421,422,515	1uF, 20%, 35V Tantalum	027-114-9-002
C423	56pF, 5%, 50V Ceramic	020-457-9-046
C424,425	470pF, 10%, 50V Ceramic	020-457-9-015
C426,428,429,430, 432,434	0.01uF, +80/-20%, 50V Ceramic	020-457-9-003
C431	2.2uF, 20%, 35V Tantalum	027-114-9-003
C433,435,502,503, 522,542	100uF, 20%, 10V Electrolytic	022-430-9-008
C437,438,504,505, 506,507	0.01uF, +80/-20%, 50V Ceramic	020-457-9-003
C439	15pF, 5%, 50V Ceramic	020-457-9-047
C440	10uF, 20%, 25V Electrolytic	022-430-9-009
C444,446,447	2pF, +/-0.25pF, 50V Ceramic	020-457-9-010
C508,511,516,518, 528,530	0.01uF, +80/-20%, 50V Ceramic	020-457-9-003
C512	150pF, 10%, 50V Ceramic	020-457-9-026
C513,521	33pF, 5%, 50V Ceramic	020-457-9-007
C514,523,533,536, 537,543	10uF, 20%, 50V Electrolytic	022-430-9-004
C517,532	1uF, 5%, 100V Polyester	025-312-9-008
C519,534	82pF, 5%, 50V Ceramic	020-457-9-021
C520,540	10pF, +/-0.5pF, 50V Ceramic	020-457-9-006
C525	220pF, 10%, 50V Ceramic	020-457-9-032
C527	4700pF, 10%, 100V Polyester	025-312-9-009
C529	100uF, 20%, 25V Electrolytic	022-430-9-003
C535	22pF, 5%, 50V Ceramic	020-457-9-041
C539,546,547,548	0.01uF, +80/-20%, 50V Ceramic	020-457-9-003
C541	33pF, 5%, 50V Ceramic	020-457-9-048
C544	100pF, 10%, 50V Ceramic	020-457-9-019
C545,550,652,653, 654,660	10uF, 20%, 50V Electrolytic	022-430-9-004
C549	150pF, 10%, 50V Ceramic	020-457-9-037
C651	68pF, 5%, 50V Ceramic	020-457-9-018
C655,656,657,658, 659	0.01uF, +100/-0%, 500V Ceramic	020-457-9-030
C661	0.1uF, +80/-20%, 25V Ceramic	020-457-9-033
CT401,402	4 - 25pF Trimmer	028-123-9-002
CT403	3 - 25pF Trimmer	028-123-9-003
CT501,502	3 - 25pF Trimmer	028-123-9-004
	INDUCTORS	
L501,502	2.2uHy, 10% Coil	047-092-9-005
	SWITCHES	
S401,402	Lever switch	080-202-9-002
S403	Lever switch	080-202-9-003
(S501A/501B/502/ 651/R503)	Rotary switch Assembly (Time base)	083-334-9-001
	DIODES & TRANSISTORS	
CD401,402,403, 404,405,406	1SS133 Silicon diode	151-120-9-002
CD407,408,410, 501,502,503	1SS133 Silicon diode	151-120-9-002
CD409,512	1SS86 Silicon diode	151-156-9-002
CD411	5.1V, 500mW Zener diode	152-206-9-003
CD504,505,506, 507,508,509	1SS133 Silicon diode	151-120-9-002
CD510,511,513, 514,515,516	1SS133 Silicon diode	151-120-9-002
CD517,518,519, 520,521,522	1SS133 Silicon diode	151-120-9-002
CD524,525,526, 528,529,530	1SS133 Silicon diode	151-120-9-002
CD527	3V, 500mW Zener diode	152-206-9-010
CD531,532,533, 534,536,537	1SS133 Silicon diode	151-120-9-002
CD538,539,651, 652,653,654	1SS133 Silicon diode	151-120-9-002
CD655	9.1V, 500mW Zener diode	152-206-9-011
Q401,413,514,517, 529,534	2SC1907 NPN Transistor	176-174-9-001
Q402,403,516,528	2SK514-H FET	182-106-9-002
Q404,405	2SA1206 PNP Transistor	177-071-9-003
Q406,407,518,530	2SA838-B PNP Transistor	177-121-9-001
Q408	2SK117-BL FET	182-101-9-001
Q409	2SA1161 PNP Transistor	177-048-9-003
Q410,512,525	2SA1015-Y PNP Transistor	177-043-9-002
Q411,501	2SC2570A NPN Transistor	176-222-9-003
Q412,415,504,505, 506,510	2SC2785-HF NPN Transistor	176-154-9-002
Q414,502,503,655, 656	2SA1005-K PNP Transistor	177-063-9-001
Q507,508,515,519, 520,521	2SA844-D PNP Transistor	177-021-9-001
Q511,524	2SC1345-E NPN Transistor	176-151-9-002
Q513,526	2SK170-V FET	182-106-9-003
Q522,523,527,537, 538,	2SC2785-HF NPN Transistor	176-154-9-002

ASSEMBLY NO. 524-073-9-001 (continued)

SCHEMATIC SYMBOL	DESCRIPTION	B & K-PRECISION PART NO.
Q531,532,533,535, 536	2SA844-D PNP Transistor	177-021-9-001
Q651,652,653,654, 657,658	2SC1907 NPN Transistor	176-174-9-001
Q659,660	2SC3423-Y NPN Transistor	176-237-9-002
Q661,662	2SA1360-Y PNP Transistor	177-125-9-001
Q663,664,665	2SC1815-Y NPN Transistor	176-089-9-003
	INTEGRATED CIRCUITS	
U401	I.C., CA3127E Transistor array	307-338-9-003
U402	I.C., uPC4081C Op-amp	307-486-9-001
U403	I.C., 74F00DC	307-259-9-022
U501	I.C., 74LS00	307-100-9-001
U502,503	I.C., 74F74DC	307-486-9-003
U504	I.C., 74LS112	307-259-9-025
U505	I.C., LF353N Op-amp	307-442-9-002
U506	uPA68A Dual FET	182-107-9-001
	MISCELLANEOUS	
	PCB Support, nylon (short)	380-659-9-001
	PCB Support, nylon (long)	380-659-9-002
J0406,0420,0425, 0426,0427	3 pin PCB connector (small)	757-188-9-001
J0407,0408,0411, 0415,0417	2 pin PCB connector (small)	757-188-9-002
J0423,0424A,	2 pin PCB connector (small)	757-188-9-002
J0424C	7 pin PCB connector (small)	757-188-9-006
J0416,0418,0419	5 pin PCB connector (small)	757-188-9-007
J0424B	4 pin PCB connector (small)	757-188-9-008

SUBASSEMBLY NO. 524-074-9-001

	RESISTORS	
R901,904	1k ohm, 1%, 1/4W Metal Film	013-172-9-102
R902	6.8k ohm, 1%, 1/4W Metal Film	013-172-9-682
R903	18k ohm, 1%, 1/4W Metal Film	013-172-9-183
R906,907	10K ohm Resistor network	012-053-9-002
R908,912,913	10k ohm, 1%, 1/4W Metal Film	013-172-9-103
R914	330 ohm, 1%, 1/4W Metal Film	013-172-9-331
RV901	1k ohm Potentiometer	008-910-9-001
RV902/S903	1k ohm Potentiometer with switch	008-910-9-002
	CAPACITORS	
C901	1000pF, 10%, 50V Ceramic	020-457-9-005
C902	10uF, 20%, 50V Electrolytic	022-430-9-004
C903,905,906,907, 908,909	0.01uF, +80/-20%, 50V Ceramic	020-457-9-003
C910,911	0.01uF, +80/-20%, 50V Ceramic	020-457-9-003
	SWITCHES	
S901	Push button switch	088-202-9-002
S902	Push button switch	088-202-9-003
	TRANSISTORS	
Q901	2SA844-D PNP Transistor	177-021-9-001
	INTEGRATED CICUITS	
U901,902	I.C., 74LS00	307-100-9-001
	MISCELLANEOUS	
J0503	3 pin 90° PCB connector (small)	757-190-9-001
J0541	2 pin 90° PCB connector (small)	757-190-9-002
J0518,0519	5 pin 90° PCB connector (small)	757-190-9-003
J0504	6 pin 90° PCB connector (small)	757-190-9-004
J0539	12 pin 90° PCB connector (small)	757-190-9-005

SUBASSEMBLY NO. 524-075-9-001

	RESISTORS	
R781	10 ohm, 1%, 1/4W Metal Film	013-172-9-100
R782	39k ohm, 1%, 1/4W Metal Film	013-172-9-393
R783,786	100k ohm, 1%, 1/4W Metal Film	013-172-9-104
R784,785	10k ohm, 1%, 1/4W Metal Film	013-172-9-103
R787	220k ohm, 1%, 1/4W Metal Film	013-172-9-224
R788,790	470k ohm, 1%, 1/4W Metal Film	013-172-9-474
R789	470 ohm, 1%, 1/4W Metal Film	013-172-9-471
R791	12k ohm, 1%, 1/4W Metal Film	013-172-9-123
R792	2k ohm, 1%, 1/4W Metal Film	013-172-9-202
R793	75k ohm, 1%, 1/4W Metal Film	013-172-9-753
R794	4.7 ohm, 5%, 1/4W Carbon	002-104-5-479
R795	390 ohm, 1%, 1/4W Metal Film	013-172-9-391
RV781	100k ohm Cermet trimmer pot.	010-091-9-004
RV782,786	10k ohm Potentiometer	008-910-9-003
RV783	2k ohm Potentiometer	008-910-9-004
RV784	200k ohm Potentiometer	008-910-9-005
RV785	10k ohm Potentiometer	008-910-9-006
	CAPACITORS	
C781	47uF, 20%, 25V Electrolytic	022-430-9-010
C782,783	0.01uF, 5%, 50V Polyester	025-312-9-010
C784	5pF, +/-0.25pF, 50V Ceramic	020-457-9-044
C785	1000pF, 10%, 50V Ceramic	020-457-9-005
C786	220pF, 10%, 50V Ceramic	020-457-9-032
	SWITCHES	
S781	Push button power switch	088-202-9-004
	DIODES & TRANSISTORS	
CD781,782,783	36V, 500mW Zener diode	152-206-9-012
Q781,782	2SD880-Y NPN Transistor	172-082-9-001
	INTEGRATED CIRCUITS	
U781	I.C., 4011B	308-114-9-001
	MISCELLANEOUS	
DS781,782	Lamp, 14V, 80mA	400-103-9-001
J0630,0631	2 pin 90° PCB connector (small)	757-190-9-002
J0640	6 pin 90° PCB connector (small)	757-190-9-006
J0632B	12 pin 90° PCB connector (large)	757-191-9-001

SUBASSEMBLY NO. 524-076-9-001

	RESISTORS	
R419,420	6.8k ohm, 1%, 1/4W Metal Film Res.	013-172-9-682
RV403A/B	100k/10k ohm Dual Potentiometer	008-910-9-006
	MISCELLANEOUS	
J0716	5 pin 90° PCB connector (small)	757-190-9-003

SUBASSEMBLY NO. 524-077-9-001

	MISCELLANEOUS	
J0847	AC Voltage selector	763-216-9-001
J0850	6 pin 90°connector (large)	757-191-9-002

PARTS ORDERING INFORMATION

There is a minimum charge for each invoice. Orders will be shipped C.O.D. unless previous open account arrangements have been made or remittance accompanies order. Advance remittance must cover handling and postage or express charges. Specify model and serial number when ordering replacement parts.

ORDER REPLACEMENT PARTS FROM:

B & K-Precision, Factory Service Operations
Maxtec International Corporation
6470 West Cortland Street
Chicago, Illinois 60635
Telephone: (312) 889-1448

B&K PRECISION

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